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FEBRUARY, 1848.

Correspondence of the Commissioners deputed to the Tibetan Frontier; communicated by H. M. Elliot, *Esq., Secretary to the Government of India, Foreign Department.*

From Capt. A. Cunningham, *Senior Commissioner, Tibetan Frontier,*
To Lieut.-Col. H. M. Lawrence, C. B. *Resident, Lahore.*
Dated Camp Haulé, 15th Sept. 1847.

Sir,—I have the honor to report to you that Dr. Thomson and myself arrived at this place yesterday, Lieut. Strachey having left us on the morning of the 12th to proceed by a somewhat more circuitous route, by following the course of the Pârang River for a few days, instead of proceeding direct to Haulé.

2. On our arrival here, we found two persons, named Angchoo and Gyabo, who had been sent to meet us by the Garpan of Gáreé, on the receipt of our letter to his address, despatched from Khyuré (copy of which was forwarded to you with my last letter No. 2 of the 29th ultimo). These persons reported that they had been sent to meet us by the Garpan, who had directed them to return to Gáreé with any orders that we might give them,—or, in the event of our not giving them any orders, to return at once. On being questioned regarding the Sirdars who were reported to have arrived from Lassa, they stated that one Sirdar, named Khalun Shakchoo, had arrived for the purpose of settling some revenue matters; that when they left Gáreé he was preparing to return to Lassa, and that by this time he must have set out

from Gárcé. On being further questioned, they stated that no Sirdar had arrived at Gáreé for the purpose of pointing out the ancient bonndary between Ladák and the Chinese territory. As these men were despatched by the Governor of Gáreé, their statement may be taken as a full confirmation of the report, which I mentioned in my last letter, that no Chinese boundary Commissioners had arrived at Gáreé.

3. In the absence of any Chinese boundary Commissioners, we are left to follow out the instructions contained in the 5th para. of Mr. Secretary Elliot's Letter, No. 219 of 27th July last, to my address, "that the Commissioners should individually use their best endeavors to increase the bounds of our geographical knowledge." It was with this view that Lieut. Strachey, continued his course down the Parang river, while Dr. Thomson and myself took the direct road to Haulé, over the Lanak Pass. I annex a sketch map which will show the route which we have already surveyed, and those which we propose to follow as far as Leh. From Dunyar, on the Parang river, Lieut. Strachey will follow the course of the stream as far as Akché; we shall thus obtain an actual survey of the whole course of the Parang, or Para river, with the exception of about 25 miles between Akché and Khyuré. From Akché Lieut. Strachey will proceed to Haulé, over the Budhpú Pass, and so connect his survey with mine.

4. From Haulé Dr. Thomson and myself propose to follow the course of the Haulé river to its junction with the Indus, thence passing by the sulphur and borax mines, (which we shall carefully examine) we will take the high road to Leh by the Tnng lung Pass and Giah. This was the arrangement that was agreed upon with Lieut. Strachey, before he parted from us: as by the time that he will reach Haulé, the season will be so far advanced that the only road open to him will be that along the bed of the Indus, which will accordingly survey down to Leh; we shall thus have two routes surveyed in detail from Haulé to Leh. If, however, Lieut. Strachey should be able to penetrate to the eastward from Haulé, according to his instructions, he will inform me of the same, and Dr Thomson and myself will then take the river road, and survey the course of the Indus from the borax mines down to Leh.

5. I beg further to report to you that neither of the Agents appointed by Maharajah Gulab Singh, has yet arrived, nor have we any certain intelligence of their approach Had there been any Chinese Commis-

sioners on the frontier, the absence of the Maharajah's Agents would have prevented us from settling any portion of the boundary during this season. As there are, however, no Chinese Commissioners, the absence of the Maharajah's Agents, Meean Jowâhir Singh, and Mehtâh Bustee Ram, has only occasioned us much inconvenience in procuring coolees and supplies. Their absence appears to me to be unaccountable; for, on the 6th instant, I received a letter from Lieut. Taylor, your assistant in Kashmir, dated the 3rd of August, informing me that Meean Jowahir Singh and Mehtâh Bustee Ram, had been appointed by the Maharajah to meet the Commissioners at Haulé. As the distance between Kashmir and Leh is only 20 days' journey, even for laden coolees, Mecan Jowahir Singh should have been at Leh by the 23rd of August, and allowing him 3 days halt at that place, both he and Mehtâh Bustee Ram, the Thanadar of Leh, might easily have reached Haulé by the 10th of this month.

6. Herewith I have the pleasure to enclose a diary* of our marches from the 29th of August, to the 14th of September, the date of our arrival at Haulé, in transmitting which I beg to observe that we have not halted for a single day during the whole of that period.

7. Trusting that our arrangements, both past and future, may meet with the full approval of the Right Honorable the Governor General,

I have, &c.

(Signed) Alex. Cunningham,
Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Haulé, 15th September, 1847.

(True Copy)

H. M. Lawrence,
Agent and Resident.

From Capt. A. Cunningham, *Senior Commissioner, Tibetan Frontier,*
To Lieut.-Col. H. M. Lawrence, C. B. *Resident, Lahore.*
Dated Camp Lé, 9th October, 1847.

Sir,—I have the honor to report to you that Dr. Thomson and myself arrived at Lé, the capital of Ladâk, on the 2nd instant, since which we have halted up to this day for the purpose of observing the Meteo-

* As a more convenient arrangement for the reader, we have thrown together, in the sequel, the various diaries alluded to in the correspondence.—Eds.

rological and Magnetical instruments, and of collecting as much information as possible regarding the country and people. Hourly observations of the meteorological instruments and of the declinometer have been recorded for two days; and the magnetic dip and horizontal force have likewise been determined. The latitude of Lé has been fixed by 7 meridian altitudes of the Sun, by about 30 equal altitudes of the Sun, and by several altitudes of the Pole Star; and its longitude has been obtained by the observations of the solar eclipse of this day.

2. We purpose to leave Lé to-morrow morning by two different routes. Dr. Thomson will proceed to Nubra, and up the Shayok river to its source; and, if possible, he will cross the Karakoram range for a few marches to the northward, on the Yarkand road; after which he will return by the Shayok river and follow its course down to Iskardoh. I have furnished him with a sextant and a surveying compass of my own; and I have no doubt he will be able to map his route with considerable accuracy.

He has also minimum and boiling-point thermometers, as well as solar radiation and dry and wet bulb thermometers.

3. I will myself take a southerly route by following the Indus for a few marches to Khalets or Kulutsí, and thence to the Drâs river, which I will survey to its source. From Drâs, if the passes remain open, I will proceed by the Pilyl [or Pileel] rivulet, an eastern feeder of the Kishen-Gunga river, to Astor or Hasora, and down the Hasora river, and across the Indus to Gilgit. If, however, the western passes should be closed at the head of the Drâs river, I will then proceed through the northern part of Kashmir to the head of the Kishen-Gunga river, and thence by the Hasora river to Gilgit.

4. We have chosen these routes to the north and south of the course of the Indus, in order that we might not go over the same ground as Lieut. Strachey; who from the lateness of the season at which he will arrive at Lé, will be obliged to take the river route. We shall thus have three distinct routes surveyed from Lé towards Gilgit.

5. Of the necessity of surveying any lines of country which have been traversed by Trebeck and Vigne, I need produce no other proof than the disagreement between their maps. To the general accuracy of Trebeck's survey I can speak personally: as on three different occasions, in 1839, in 1846, and during the present year, I have myself surveyed

portions of his route. I have likewise, during the past year, surveyed many portions of Vigne's route; and I am thus able to state positively that his surveys are in many places erroneous. The following instances will be sufficient to show the inaccuracy of his map. 1st. In the Kangra district, he conducts the Guj river from Rihlee into the Bân-Gunga, beneath the walls of Kangra: whereas the Guj follows an independent course, and falls into the Byâs several miles below the confluence of the Bân-Gunga. 2nd. In the map accompanying Baron Hugel's travels [which is only Vigne's map with the Baron's route inserted] Vigne's position of Kruhim or Mori-Muhul differs from the Baron's position of Muhul by 10 miles. To the general accuracy of the Baron's route from Bilâspur to Nadon and Nûrpûr, I can also speak personally; and I am therefore able to state that Vigne's position of Mori-Muhul is undoubtedly wrong. Mori is a village, and Muhul is an old ruined palace just above it; whereas Kúrúhi, the residence of Raja Ranavir Chund of Kotoch, is two miles distant from it. Vigne is therefore doubly wrong; in the name as well as in the position.

6. In selecting a route which will conduct me by the head of the Kishen Gunga river to Hasora, I believe that I shall best fulfil the intentions of Government as detailed in the instructions furnished to me in Mr. Secretary Elliot's Letter No. 249 of the 27th of July last to my address; in which I am directed to follow out my own antiquarian pursuits, as well as to increase our geographical knowledge. At the head of the Kishen-Gunga river, there is a district named Pakhtâwar; which, from its proximity to Kashmir is, I have no doubt, the original seat of the Pakhtâns (or Afghâns). Our earliest authority for coupling the Afghans and Kashmiris together is Herodotus, whose city of Kaspapuros (called Kaspaturos by Isidor of Charax, and Spaturos by the Pentingarian Tables) I would correct to Kâspâkturos; that is, the city (or country,) of the Kâs and Pakhtâns (the Kashmiris and Afghans).

The similarity of features of the two people would alone argue their common origin: but their former juxta-position, the one on the Jehlam and the other on the Kishen-Gunga, places the point (in my opinion) beyond dispute. The fact of their diversity of language is easily accounted for. The Pakhtâns, who are only a branch of the Kâs tribe, preserved their peculiar language and customs in the mountainous country which they occupied; whereas the language and the customs of the

Kâs proper, were both lost in those of the more civilized Hindus, whom they had conquered. Such has in fact been the case in Persia and in India from the earliest times. The Mogals of Jenghiz Khân and Hulâka have long since disappeared in Persia, while their fellow-countrymen, the Hazaras of the Hari river, still speak Mogali.

7. Hasora, I believe to be the country of the Abisares of Alexander's historians, on account of its proximity to the Dardu districts, as it is always coupled with the Dards by Sanskrit writers—In Yasin and Gilgit, (called Gilit by the people themselves,) I believe that we have the Arsagalitæ of Pliny still preserved. To the south of the Dards again lies the country of the Gakars, whose ancient as well as whose modern capital was Dángali, which I have no doubt gave its name to the Dangale of Pliny. These, as well as the site of Aornus, are a few of the interesting archeological points which I propose to investigate during my survey of these countries.

8. I have not yet had time to digest and arrange the information which I have collected regarding Ladâk: but I may mention that its present name is a modern one, the ancient name being Mâ-yul.

Lé also is a modern capital, the ancient metropolis having been at Shé, now a large village 8 miles to the south-eastward of Lé.

9. Herewith I have the pleasure to enclose my Diary of our proceedings from the 16th of September up to this date.

I have, &c.

(Signed) Alex. Cunningham,

Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Lé, 9th October, 1847.

(True Copy)

H. M. Lawrence,

Agent and Resident.

From Capt. A. Cunningham, *Senior Commissioner, Tibetan Frontier,*
To Lieut.-Col. H. M. Lawrence, C. B. *Resident, Lahore.*

Dated Camp Bij-Bihára in Kashmir, 14*th Nov.* 1847.

Sir,—I have the honor to report to you that I arrived in the city of Kashmir on the 2nd instant, having been prevented by continued falls of snow from following the route by the Tilêl valley to Garês, as

I had intended to have done when I last reported to you in my letter No. 6, dated Molbil, 20th October, 1847.

2. On the 23rd and 24th of October the snow (which had been falling on the heights for some days) began to fall in the valley of the Drâs river, and when I reached Drâs on the 25th ultimo I found that the passes to Garés and Iskardoh were completely closed. As the weather was still very threatening, I determined to proceed at once to Kashmir. I therefore marched the next day to Matên, through a heavy snow storm. The snow continued to fall the whole night, and the next day I made a march of 16 miles over the Seoji-lâ into Kashmir through snow and hail. On the three following days I continued to march down the valley of the Sind river through snow and mud: the snow having fallen down to a level of 6,000 feet for six consecutive days. On my arrival in Kashmir I found that all the passes, excepting three, were closed for the season, unless some continued fine weather should follow.

3. The three passes which remained open were: 1st, the Banahal Pass, by which the Lahore Dâk travels; 2nd, the Baramula Pass, by which the Jehlum leaves Kashmir; and 3rd, the Seoji-lâ, or Drâs Pass. by which I had entered the valley. The Garês Pass was completely closed: in consequence of which Mr. Agnew, Lieutenant Young and Mr. Winterbottom, who were returning from Gilgit, have been obliged to go round by Iskardoh and the Drâs Pass. Even the Pir Panjal Pass, which usually remains open throughout November, has been closed since the 25th of October.

4. Under these circumstances, as the only available route to the Dardu country was viâ the Baramula Pass, which continues open throughout the year, it appeared to me that the best plan which I could follow for the prosecution of the various objects of the Mission, would be to pay a short visit to the principal architectural antiquities of Kashmir, with the view of measuring them and of describing them in detail. For this purpose I left the city of Kashmir on the 8th instant, and I am now on my way back, having visited the various ruins at Pandretan, Avantissur, Bij-Bihâra, Mârttand, and the caves of Bhoma-jo; of all of which I have made plans and elevations by measurement, which will hereafter be submitted to Government. At present, I need only record my opinion that the style of architecture, exhibited

in these ancient temples of Kashmir, is distinguished by great elegance of design, combined with extreme solidity of construction. It is infinitely superior to any thing that I have seen in India; and from the simplicity of its outlines, and the beauty of its proportions, I think it may be ranked as an order of architecture not much inferior to our own classic models. I annex an elevation of one of the pillars of the temple of Mârttand. It is a polygon of twenty fluted sides.

5. During my stay of five days in the city of Kashmir, I set up the declination magnetometer and the dip-circle, and I made hourly observations of the meteorological instruments for two days. I also obtained four meridian altitudes, as well as several equal altitudes of the sun, and a few observations of the Pole star for the latitude; and the lunar distance of Venus for the longitude. I was also fortunate enough to procure copious Vocabularies of two of the three dialects of the Dardú language, viz. the Shinâ, spoken in Gilgit and Hasora, and the Khajnâ, spoken in Hunza and Nager. The remaining dialect, the Armya of Chitrâl and Yasan, I expect to obtain without any difficulty amongst the Dardus on the Kishen-Gauga. I will hereafter compare them with the Persian, Pashtu, Sanskrit and Hindí: but, from a cursory examination of the two above dialects, I should say that they consist chiefly of Sanskrit and Hindí.

6. I expect to reach the city of Kashmir on the 18th, where I shall again observe the various instruments; and, after a halt of a few days for that purpose, I intend to proceed vîa the Baramula Pass, to Mozufarabad, and thence up the Kishen-Gauga river as far as may be practicable at this season. On my route to Baramula I shall visit the ruins of Pahârispur and Patan.

7. I have been so continuously occupied since I reached the city of Kashmir that I have been unable to prepare a Diary of my marches: but I will transmit this document along with my next report.

I have, &c.

(Signed) Alex. Cunningham,

Bl. Capt. Senior Commissioner, Tibetan Frontier.

Camp Bij-Bihara, 14th November, 1847.

(True Copy)

H. M. Lawrence,

Agent and Resident.

From Capt. A. Cunningham, *Senior Commissioner, Tibetan Frontier,*
To Lieut.-Col. H. M. Lawrence, C. B. *Resident, Lahore.*

Dated Camp Gingal, 15 miles west of Baramulla, 1st Dec., 1847.

Sir,—I have the honor to report to you that I reached this place yesterday, and that I have been detained here to-day from want of porters, which the Bamba-Chief, Sultan Zuburdust Khan, professes his willingness to give; but which his servants appear to be making no exertions to procure.

2. Herewith I have the pleasure to enclose the Diary of my marches and proceedings up to the present date. From a perusal of this document it will be seen that during my short stay in Kashmir, my attention was principally directed to the measurement and illustration of its architectural antiquities, and to the acquirement of precise information upon points regarding which different authors are at variance; and I am happy to say that my researches have been attended with success.

3. I have discovered, beyond all doubt, the exact position of the ancient capital of Kashmir in Pandritan, which is the local corrupt form of the Sanscrit name Puranadhisthana, or Puranadhithan, the "old chief city." In A. D. 1032 Abu Rihan Al Biruni states that the capital of Kashmir was named "Addistan," and that it was four farsangs from a great lake, certainly the Waller of the present day. Four hundred years earlier, in A. D. 640, the Chinese pilgrim Huan Thsang states that the old capital was on the river to the south-east of the new city. Now we know that the present Srinagar was built by Pravarasena, who reigned from A. D. 432 to 464. Huan Thsang's description of the ancient city, therefore, corresponds with the actual position of Pandritan, which is to the south-east of the present town. But to put this point beyond all doubt I may state that in an old abridged copy of the Raja Taringini, which has marginal notes identifying the ancient cities under their Sanscrit names, with the more modern appellations of the corrupt spoken dialect of Kashmir, I found an account of the building of a temple by Nirjita Verwma in A. D. 920—921, at Puranadhisthana, which name in the original notes is identified with Pandritan.

4. I have also been fortunate enough to discover another point of much interest and importance in the comparative geography of the countries to the northward of Kashmir; which is the identification of

the ancient country of Bolor with the present Balti, or Little Tibet. The Bolor mountains have occupied an uncertain position in our maps for a considerable period, which I am now able to define with precision. They are in fact that chain of mountains, hitherto called the Muztak, which forms the northern boundary of the district of Balti. Amongst the Dards who speak the Shina language, namely, in Hasora, Gilgit, Chilas, Darel, Kohli and Palas, all lying along the Indus, Balti is known only by the name of Palolo. What renders this identification more striking and complete is the mention by Huan Thsang in A.D. 640, that the kingdom of Polulo "produced much gold:" a production for which Balti or Palolo is still celebrated, and which is one of the chief sources of its revenue.

5. But the most valuable discovery which I have made since my last report, dated the 20th ultimo, has been the acquisition of three new Sanscrit Dramas, two of which were hitherto known to us only by name; and the third was altogether unknown. Copies of these Dramas are now being made; which, when completed, will be forwarded to Government. The Dramas are the following:

1. *Anergha-Raghava*, a long work, written by Murara-kavi, a Kashmirian brâhman. In this piece, as its name imports, the principal exploits of Rama are dramatized. It is one of the hitherto lost plays of which Professor Wilson had obtained only the name.

2. *Sringara-Tilaka*, a short piece written by Sri Rudra-kavi, a Kashmirian brâhman. This would appear to be a sort of monologue, in which one actor successively describes and personates the characters of various women. It is another of the hitherto lost plays of which Professor Wilson had obtained only the name.

3. *Vasavadatta-cheritra*, a short piece, hitherto entirely unknown, written by Suban-du-kavi, a Kashmirian brâhman. In the Retnavali (also a Kashmirian drama) which has been translated by Professor Wilson, (Hindu Theatre, vol. 2) the heroine is likewise named Vasavadatta. In that play, however, she is the Rani or Queen of Vatsa, the Raja of Kausanebi. All the other characters are different, as will be seen by the forthcoming list of the dramatis personæ of this new play:

1. *Chintamani*, Raja of Kusumapura.
2. *Kandarpaketu*, Son of the Raja.
3. *Sringara-sekhar*, a Kshatriya, father of Vasavadatta.

4. *Anangavati,* mother of Vasavadatta.
5. *Vasavadatta,* beloved by Kandarpaketu.

I have, &c.

(Signed) ALEX. CUNNINGHAM,
Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Gingal, 1st December, 1847.

(True Copy)

JOHN LAWRENCE,
Officiating Resident.

From Capt. CUNNINGHAM, *Senior Commissioner, Tibetan Frontier,*
To JOHN LAWRENCE, *Esq. Officiating Resident, Lahore.*

Dated Camp Hazroo in Chach, 18th December, 1847.

SIR,—I have the honor to report to you that I reached this place yesterday viâ Mozafarabad and the Hazâra country, through six days of snow and ten days of rain. Herewith I beg to forward a diary of my marches up to this date.

2. In my letter No. 8 of the 20th ultimo, I reported to you that I intended to communicate with Doctor Thomson from Mozafarabad, but on my arrival there, I found that owing to the continual fall of snow all the passes towards Gilgit had become closed for the season, and I could not find any one who would undertake to convey a letter to Gilgit, or even to Chelâs on the Indus. For the same reason I was obliged to relinquish my intended exploration of the Kishen-Gunga river; but this I regret the less as I understand that the whole course of the Kishen-Gunga has during this year been examined by Mr. Vans Agnew.

3. Under these circumstances I took the only route left open to me through the Dhamtâwar and Hazâra districts; and I have the satisfaction to report to you that I have discovered the ancient names of these two districts in the times of Alexander the Great and Ptolemy the Geographer. As these are two points of much interest and value in the comparative geography of the Punjâb, a few details regarding them may perhaps be acceptable.

First. The present Hazâra district is the actual country of King Abisares of Alexander's historians. Its identification is established by the following statements of ancient authors. Abisares was King of the

Bergindii, that is of the people inhabiting the rich Hazâra valley of Vergund. The Soanus river had its rise in the mountainous parts of Sabissa (or Abisâra), or using the modern names, the Swân (or Sohan) river has its rise in the hilly parts of the Hazâra country. Lastly, the people to the northward of Peshâwar fled across the Indus into Barisades (or Abisares) for security; that is they took refuge in the Hazâra country.

Second. The present Dhamtâwar district, called Kash by the people of the country, is the *Varsa*-regio of Ptolemy, which he places in the hilly part of the Doâb, between the Indus and the Jehlam. This district is mentioned at a later date, in A. D. 640, by the Chinese Pilgrim Hwân Thsâng, as U-la-shi; and at a still later period, in A. D. 900, the Raja Taringini records that Sankara Vermma was killed by an arrow on his return from an expedition in the Urasa country.

4. These successful identifications, together with those reported to you in my last letter No. 9 of 1st December, have given me some hope that I shall be able to discover the situation of Aornos, for which purpose I am now about to proceed towards the Indus. As however the Yusafzai country is at the present time unsafe for a traveller, I must be content with such information as can be procured from the people in the neighbourhood. From the Indus I shall proceed to the Doâb, between the Chenâb and Râvi, to inspect the ruins of a place called Saugala, which may possibly be the Sangala of Alexander's historians, after which I shall continue my march viâ Lahore to the British territory.

5. For the construction of a Map of the countries which I have visited, and for the preparation of a detailed report upon all the points which have been the objects of my research, I shall require the uninterrupted leisure of three or four months or perhaps even a longer time, and if Chinese Commissioners are expected on the frontier at the beginning of the next season, my Map will be ready for the use of the British Commissioners by the beginning of June. I trust therefore, that there will be no objection to my residing at Simla during the time that I am engaged upon the Map and report. Any other place would no doubt answer equally well for the construction of the map; but for the proper preparation of the antiquarian and archeological portion of a report, such as I wish to make to Government, I must have access to my own Library, which is now lying partly at Simla and partly at Kal-

ka. I have also rented a house at Simla; my residence at any other place would therefore only be an extra expense to me without the advantage of access to my Library. At Simla I shall likewise be able to communicate with Colonel Boileau, upon whose judgment and assistance I must depend for the reduction and arrangement of the various magnetical and meteorological observations, which I have made during my present journey. Under these circumstances I trust to the favor of Government that I may be permitted to reside at Simla, for the preparation of my map and report.

I have, &c.

(Signed) ALEX. CUNNINGHAM,

Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Hazroo, 18th December, 1847.

From Capt. A. CUNNINGHAM, *Senior Commissioner, Tibetan Frontier,*
To JOHN LAWRENCE, *Esq. Resident, Lahore.*
Dated Camp Shumsabad, Huzára, 7th January, 1848.

SIR,—I have the honor to forward to you a Report and Diary of Dr. Thomson's proceedings from the 20th of October, up to the 1st of December, 1847. The letter is dated Camp Iskardo, 1st December, and as Dr. Thomson proposed leaving Iskardo for Kashmir on the following day, he must now be most probably in Kashmir, or perhaps on his way towards Hazâra.

2. I am happy to state that the sketch map alluded to by Dr. Thomson, supplies in a satisfactory manner the long desiderated sutvey of the Shayuk or Nubra river, from the foot of Nubra downwards to its junction with the Indus. With Lieut. Ralph Young's survey of the middle Indus in the Iskardo and Gilgit territories, and Lieut. Strachey's, and my own survey of the Upper Indus in Ladâk, the Government will now possess a complete survey of the Indus and of its tributaries, from Haulé to Gilgit.

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) ALEX. CUNNINGHAM,

Bt. Capt. Senior Commissioner, Tibetan Frontier.

Camp Shumsabad, 7th January, 1848.

From Assistant Surgeon Thomas Thomson, *Commissioner, Tibetan Frontier,*

To Capt. A. Cunningham, *Senior Commissioner.*

Dated Camp Iskardo, 1st December, 1847.

Sir,—I have the honor to forward for your information a diary of my route from the 20th of October, and a rough sketch of survey of Shayuk and Indus rivers from Nubra to this place, which however having been reduced in a very rude manner, can by no means be considered as representing accurately the course of the river.

2. I have been detained at Iskardo much longer than I wished, being in uncertainty regarding my future movements. My intention had been after a few days' halt to proceed towards Gilgit—but from all the information I can collect here regarding that country, it does not seem to me to be in a state fit for scientific investigation. Mr. Agnew, having proceeded to Cashmere shortly before my arrival here, I have not of course any very authentic information on the subject, but on the whole I have judged it best to proceed to Cashmere, for which place I propose to start to-morrow morning.

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) Thomas Thomson,

Commissioner, Tibetan Frontier.

Camp Iskardo, 1st December, 1847.

From Capt. A. Cunningham, *Senior Commissioner, Tibetan Frontier,*

To John Lawrence, *Esq. Resident, Lahore.*

Dated Camp Hosan Abdal, 10th January, 1848.

Sir,—I have the honor to report to you, that I reached Hosan Abdal this day, after two visits to the Yusufzai country in search of Aornus, which I believe that I have discovered beyond all reasonable doubt, in the vast hill-fortress of Rani-gat or Rani-garh, situated immediately above the small village of Nogram, about 16 miles north by west from Ohind, and somewhat less in a direct line from the nearest point on the western bank of the Indus. Rani-gat is, I suspect, only a corruption of Rani-garh, the former name being a Pashtu term for the "Rani's-

stone," a huge isolated block of granite on the top of the hill about 50 feet in height, on which a Rani of former times is said to have seated herself daily.

2. Rani-gat corresponds in all essential particulars with the descriptions of Aornus as given by Arrian, Strabo, and Diodorus, excepting in its elevation, the height of Rani-gat above the plain not being more than 1000 feet; which is however a very great elevation for so large a fortress. But as the breadths of all the rivers of the Punjab recorded by Arrian are at least four times too much, I do not think that the difference of height is of much importance; more particularly as we know that Arrian's height must have been greatly exaggerated, otherwise Aornus would have been covered with snow at the time of Alexander's siege, a fact which is not mentioned by a single ancient author. Mr. Williams, the latest historian of Alexander, estimates Arrian's 20 stadia at three quarters of a mile, which is about the slant height of Rani-gat.

3. The points of agreement between the two places are the following:—Rani-gat is an isolated inaccessible hill, with only one road cut in the rock leading to the top, although there are certainly two, if not more, rather difficult pathways, which indeed was the case with Aornus. It has also a detached peak as high as the place itself; and the intervening hollow from 50 to 150 feet in depth, corresponds to the ravine across which Alexander built his rampart. It was supplied with water by three wells cut in the rock, and by a tank in the ravine enclosed between two dykes, from which the constant permeation would have formed a small rill, similar to the trickling streams which now percolate from the tanks of Kalinjar and Gwalior. Lastly, its situation answers admirably to all the data, which have been handed down to us regarding Aornus. It stands between the Swat river and the Indus, and not far from the latter stream. To the north-west, about 20 miles distant, are the large and important villages of Bazar and Rustam, adjoining each other, and which now form the entrepôt of all the trade between the Swat valley and the Yusufzai plain. This entrepôt is, I have little doubt, the Bazaria of Alexander's historians, which submitted to him on his march eastwards, after the conquest of the Swat valley. As the Bazarians at his approach abandoned their city and took refuge in Aornus, the relative positions of Bazar and Rani-gat suit exactly all the conditions required for the ancient localities.

4. Regarding the antiquity of Rani-gat, which is the only point now wanting to complete the proof of identity of the two places, I cannot speak so positively; but some valuable light has been thrown upon this subject, by two pieces of sculpture which I luckily found amongst many Buddhist fragments in the ruined citadel. These are the naked body of a man with the Macedonian chlamys, or short cloak, thrown over the shoulders and fastened in front, and a human breast adorned with a necklace of which the clasps are formed of two centaurs, boldly designed and gracefully executed. As these sculptures undoubtedly owe their origin to the influence of Grecian art, they show that the antiquity of Rani-gat certainly reaches as high a date as the second century before Christ, at which time the successors of Alexander, who ruled over the Kabul valley, still preserved some of the arts and arms of Greece. A higher antiquity of two or three hundred years, or even more, may therefore safely be granted to the massive granite walls of this Cyclopean mountain fortress, which must always have been the strongest and largest fortified place in the country. Even now the natives draw a distinction between it and other ruins; for they call Rani-gat a *Killah*, or fortress; whilst all others are designated *garhis*, or forts. If Rani-gat was not the Aornos of Alexander, it was certainly the Aornos of the times in which it flourished.

5. I have also secured some very perfect specimens of Buddhist sculpture, including a full length figure of Maya, the mother of Buddha, from the ruins of a small hill-fort near Jumal-garhi, about 28 miles to the westward of the Indus. But the most valuable acquisition which I have made has been the discovery of two short Ariano-Pali inscriptions in the same character, as that which is found upon the reverses of the Indo-Grecian coins. As both of these inscriptions bear dates, and as they are the oldest dated inscriptions hitherto found in India, I consider that the possession of them will be very cheaply purchased at the hire of a single camel for their carriage. I am therefore now bringing them, as well as the sculptures, along with me towards Lahore, from whence I will forward them to Government through the Ordnance Commissariat Officer at that station. The more ancient of the two inscriptions is dated in "Samvat 37, or the first day of the bright half of the month of Sravand, in the reign of Mahadaya, king of the Gushang (tribe)." The other inscription is dated in Samvat 333. The Gushang

were the most powerful tribe of the Toehari; who, about the beginning of our era, overran both Persia and India. As I was the first to read their name upon the Indo-Scythian eoins, I feel mueh satisfaetion at finding my reading so fully eonfirmed by the diseovery of this inseription.

6. I am now proseeuting my researehes for the identifieation of the aneient Taxila, whieh was for many eenturies, the ehief eity between the Indus and Jehlam; after whieh I shall eontinue my route towards the British Territory viâ Lahore.

7. As in my letter No. 10 of the 18th ultimo, I mentioned on native authority that owing to the unsettled state of the Yusafzai eountry, I should probably be obliged to eonfine my inquiries to sueh information as eould be proeured from the people in the neighbourhood, I have now mueh satisfaetion in stating, from personal experienee, that, during my two visits to the Yusafzai distriet, I found the people happy and eontented, and the ehiefs highly satisfied with the arrangements whieh had been made for the settlement of their eountry by the British Authorities at Peshawar. My researehes extended as far north as Char-golai, within 4 miles of the Buner frontier. In a few years henee I have little doubt, that the Yusufzai plain will regain its former prosperity, and exhibit onee more the same smiling sheet of rieh eultivation, which it must have shown under the settled administration of the first Mogul Sovereigns of India. The traees of large villages are numerous over the whole plain.

8. Herewith I transmit a eopy of the Diary of my marehes from the 18th of Deeember up to the present date.

I have, &e.

(Signed) Alex. Cunningham,

Bt. Capt. Commissioner, Tibetan Frontier.

Camp Hosan Abdal, 10th January, 1848.

Diary of a route of Assistant Surgeon Thomas Thomson, *Commissioner, Tibetan Frontier, from 21st October to 30th November*, 1847.

Camp Iskardo, 30th November, 1847.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
1847.			
21st Oct.	Lyakjung.	9	Crossed Nubra valley to Taghur (halting place of 16th and 17th) and thence to near junction with Shayuk river.
22nd ..	Hundar.	9½	Over gravelly bed of Shayuk which is divided into several branches. Forded it half way without difficulty. Hundar a large village.
23rd ..	Tertse.	10	Along south bank of river commencement of march through cultivation and villages, remainder very barren and stony.
24th ..	Unmaru.	5½	Much delay in crossing river at commencement of march. It was divided into numerous branches, three of which were deep (2½ to 3 feet in places generally above 2). Afterwards along N. bank generally barren. Camp at a large village.
25th ..	Karu (Camp).	9½	Along N. bank of river through barren stony country. The mountains gradually approach river and at end of March leave only room for stream to pass. No village.
26th ..	Waris (Camp).	8	Leave bank of river which is impracticable, to ascend a small valley descending from the north. Its banks were exceedingly barren and precipitous, and the road consequently difficult. A few links, only used for summer residence, and some fields round camp. Snow fell during the afternoon.
27th ..	Boghdan (Camp).	7	Crossed a high mountain ridge separating the Waris stream from that of Boghdan, and encamped on the latter at a place where there is a good deal of cultivation, but which is only inhabited in summer.
28th ..	Chulungka.	9	Descended Boghdan stream to its junction with the Shayuk, which I found

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			with bold rocky banks as when I left it at Karu. At intervals however there are gravelly reaches on one side or other; valley continued narrow all the way to camp. Chulungka is a very small village, almost all its cultivable ground having been carried away by the great flood 5 years ago.
29th Oct.	Turtuk.	7	Generally along stony bed of river; occasional rocky ascents to get over otherwise impassable places. Crossed river by good wooden bridge close to Turuk, a large and extensive village.
30th ..	Pránu.	11	A great part of march over steep rocky hills, exceedingly barren. Crossed river at end of march by wooden bridge. Pránu a very extensive village.
31st ..	Siksa.	7	Also a rocky march in many parts; mountains still continuing on both sides very close to stream, so that its banks are not always passable. Crossed to left bank of river by wooden bridge near Siksa.
1st Nov.	Kábás.	8	Along left bank of river. Road as for the last four days.
2nd ..	Surmu.	12	Road more level, over gravel and boulders, or elevated alluvial banks. Crossed river by bridge at commencement of march and recrossed by a very deep ford at about a mile from end. In latter half of March valley widens, and near Surmu has spread out into a very wide alluvial plain through which the river winds in many streams. A large river joins from the north opposite Surmu.
3rd ..	Kháplu.	7	The banks of the river being impracticable from bold projecting rocks road ascends a ravine, crosses a low ridge and descends upon Kháplu which is a very extensive town or village, with much cultivation and great numbers of trees.
4th ..	Halt.		

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
5th Nov.	Karku.	10	Crossed river below Khaplu. Road along bed of river or through cultivation the whole way.
6th ..	Braghar.	4	Along the right bank of the river almost the whole way. At end of march a large stream joins from the north.
7th ..	Kunes.	6½	The valley contracts below Braghar, and about two miles lower down, where it bends to the north, has become very narrow and rocky, so that the latter part of the march was a succession of ascents and descents.
8th ..	Kuru.	6	A fatiguing march over a ridge of mountains to avoid an impassable bed of the river. Road very steep and stony.
9th ..	Keris.	8	First two miles over rocks, remainder along river bed till reaching the cultivated lands of Keris, an extensive village.
10th ..	Golochu.	9	Junction of Indus is about a mile below Keris; afterwards the valley is very narrow and rocky, and the stream very rapid.
11th ..	..	9½	Road over rocks, but close to river for three miles, after which it ascends a lateral ravine and continues among low hills at some distance from the river, which is not seen again till end of march.
12th ..	Iskardo.	4	Over a sandy plain, crossing river one mile above Iskardo. Valley widens much and is very sandy. A large river joins from the northward.
13th till 31st.	Halt.		

(Signed) Thomas Thomson,
Commissioner, Tibetan Frontier.

(True Copies)

J. Lawrence,
Officiating Resident.

Diary of the Tibetan Commission, from the 29th of August 1847, *to* 10*th January*, 1848.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
1847.			
29th Aug.	To Khyuri.	$5\frac{1}{8}$	Crossed the British frontier from Chang Razing into the Chinese territory. Commenced a regular series of observations with the barometer, the dry and wet bulb thermometers, and the solar and terrestrial radiation thermometers.
30th ..	Huling.	$9\frac{1}{8}$	A mere halting place on the left bank of the Piti river. Crossed the Gyu river, which forms the boundary between the Chinese district of Chumurti and the British district of Piti.
31st ..	Lari.	$9\frac{3}{8}$	The first village is Piti. Road generally over shingly landslips.
1st Sept.	Pôg.	$8\frac{3}{8}$	On leaving Lâri passed at $2\frac{3}{4}$ miles the desolate, wintry-looking village of Tabo. From this the country was barren the whole way to Pôg.
2nd ..	Dankhar.	$9\frac{1}{2}$	Not a single village occurred the whole way between Pôg and Dankhar. On the opposite side of the Piti river however, there was the village of Máni, the largest in the Piti district.
3rd ..	Lâri.	$8\frac{6}{8}$	At 3 miles crossed the Lingti, a considerable stream about 25 miles in length. At 7 miles passed the small village of Lidang. Dip of the magnetic needle at Lâra 43° 37′.
4th ..	Halting place opposite Rangrik.	$8\frac{1}{8}$	At 5 miles passed the village of Karj. At $7\frac{1}{2}$ miles the bed of the river which, from Dankhar upwards had continued wide, open and level, was contracted to about 60 feet, between two rocks, where a wooden bridge was thrown across, a mile and a half below the large village of Rangrik, the Rerik of Trebeck and Broome.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
5th Sept.	Gyihbar.	$6\frac{7}{8}$	At 4 miles passed the village of Kyi, with a picturesque looking monastery seated on a rocky eminence. From this point the road left the Piti river and turned to the northward of the Le-chu to Gyihbar, the last village in Piti.—Height above the sea 14,000 feet.
6th ..	Jukhtá.	$6\frac{3}{8}$	A halting ground in the bed of the Le-chu, a narrow gorge 15,000 ft. above the sea. The wild leek was plentiful on this march.
7th ..	Bongrochan	$2\frac{1}{2}$	An encamping ground, 17,000 feet above the sea. Here I suffered from headache and sleeplessness. The Sangram vuzeer, as well as numbers of the coolies and servants, likewise complained of headache.
8th ..	Pratang Kongma.	7	Crossed the Parang Pass, 18,600 ft. high. No snow on south side. To the north the road laid over a snow-bed for $1\frac{1}{2}$ mile, then rough and stony to camp. A magnificent glacier filled the ravine as far down as $2\frac{1}{2}$ miles from the top of the Pass.
9th ..	Halting place.	11	Road along the bed of the Parang river, level but stony. Snow-pheasants numerous.
10th ..	Núrbú Sumdo.	11	Road along right bank of Parang river, level and stony. At this point we were about 7 miles to the south of the Great Chomorin lake.
11th ..	Dunyar.	9	Road along right bank of Parang river. Saw two Kiangs, or wild horses, on the opposite bank.
12th ..	Dongan.	$9\frac{1}{4}$	Crossed the Parang river and proceeded to the north-east, up the dry bed of a former lake of some extent. N. B.—Lieut. Strachey here parted from us and continued his course down the Parang river to Chumur.
13th ..	Gurkhyam.	$10\frac{3}{8}$	A gradual but long and very fatiguing ascent for 5 miles, to top of Sânak Pass, 18,200 feet above the sea. In crossing

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			this Pass I felt no headache whatever, but others complained of headache, which was no doubt occasioned by the elevation alone. Road from top of Pass exceedingly rough and stony for five and half miles to camp, in the bed of the Gurkhyam rivulet.
14th Sept.	Hánlé.	15	Road for $4\frac{1}{2}$ miles down the bed of the Gurkhyam, thence over gently undulating ground for 6 miles, then a steep descent of 500 feet to the Hánlé swamp, round which the road wound for $4\frac{1}{2}$ miles to Hánlé—a picturesque looking fortified monastery, seated on the end of a rocky spur, and washed on two sides by the Hánlé river. This place has rather an imposing appearance, with its square and round towers defended by Machicoulis. The peaceful Lamas however, yielded to Zorâwar Singh in 1834, without firing a shot.
17th ..	.Mâng kang.	$10\frac{7}{8}$	Road level along the left bank of the Hánlé river—a few hares amongst the Dâma jungle, which here grows upwards of six feet in height.
18th ..	Tâmashapchu.	16	Road for 9 miles along the left bank of the Hánlé river; then over a stony but easy low pass, and along a dry barren plain to the left bank of the Indus, which is here a sluggish swampy stream, abounding with wild fowl.
19th ..	Rânak.	$10\frac{3}{8}$	Road along the left bank of the Indus occasionally very stony. Passed the villages of Mûd and Nyimo on the opposite bank. At this place we took a section of the river which was 240 feet broad, and 3 feet deep, with a current of only $2\frac{1}{2}$ miles an hour. It was fordable with ease, the bed being soft and clayey. The banks are flat and low, and are covered with a long coarse grass. We observed some fish in the river.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
20th Sept.	Káldang.	11½	Road for 7½ miles along the left bank of the Indus, the latter part very rough and stony. The river in some places is not more than from 30 to 40 feet in width; after passing the village of Máhé (on the opposite bank) the road turns to the westward up the Rulang-chu, a small clear stream overshadowed with tall tamarisk trees.
21st ..	Púga.	4¾	Road for 2½ miles the same as yesterday, through tamarisk trees up the Rulang-chu. It then crossed the stream, and proceeds over undulating stony ground to Pûga, the site of the borax and sulphur mines. The borax is collected from the surface of the ground on both banks of the rivulet. The sulphur is dug out of the side of the hill on the northern bank. The bed of the stream is full of hot springs varying in temperature from 80° to 148° the boiling point of water being only 186°. The stream is full of fish. Its temperature is considerably higher than that of the air. At 8 A. M. when the air was only 32°; the water was 62°. This may account for the size of the tamarisk trees on its banks, many of which are 15 and 16 feet in height.
22d ..	Halt at Pûga	..	Halted to observe the meteorological and magnetical instruments; and to examine the sulphur and borax mines. Thermr. at 5 A. M. only 13°.
23rd ..	Ankhung.	7	Road up the Rulang-chu, extremely stony.
24th ..	Thogji Chenms.	16	Road an easy ascent for 3½ miles to the top of the Pulakonka Pass, where I connected this year's survey with that of last year. Then an easy descent for 12½ miles to the northern bank of the salt Lake, called Chokhár by the Láhulis, and Thogji Chenms by the Tibetans.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
25th Sept.	Larsa.	16	Road round the northern end of the Lake, and thence through a gap by which the lake formerly had an exit, as is proved by the millions of shells still existing in the ancient lacustrine formations, at a level of at least 150 feet above that of the present lake. From this gap the road ascended the plain of Kyung to the foot of the Tunglung Pass.
26th ..	Giah.	$14\frac{3}{8}$	Snow fell during the night, and we found the ascent of the Tunglung Pass, about 1500 feet, extremely fatiguing. The cold was intense, and the wind high; and the snow and sleet were very annoying. The descent was rough, steep and slippery for about 3 miles. Thence for the rest the road was down a gentle descent along the left bank of the Giah rivulet, passing at 13 miles the village of Rumchi.
27th ..	Halt at Giah.	..	We found it absolutely necessary to halt after the last three long marches which had prevented us from taking any observations.
28th ..	Miru.	$7\frac{1}{8}$	Road good and broad along the left bank of the Giah rivulet. Rocks throughout this day's march of a hard compact greenish sandstone, alternating with a silicious greenish conglomerate, and standing in almost perpendicular dykes. The conglomerates, although extremely hard, are generally worn smooth. If they could be cut and polished they would form beautifully variegated slabs.
29th ..	Ukshi.	$7\frac{1}{4}$	Road good down the Giah rivulet which was crossed four times by good bridges of poplar spars. Ukshi stands at the junction of the Giah rivulet with the Singhi-chu, or Indus.
30th ..	Marsila, or Marchalang.	$8\frac{1}{2}$	Road along the left bank of the Indus. At Marsila there are large plantations of poplar trees.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
1st Oct.	Chachôt.	11	Road along the left bank of the Indus, first over the irrigated fields of Changa ; then over barren stony ground to Thakna ; and thence through the fields and straggling houses of Chachôt, to Gola-bâgh, a garden and house belonging to the late Governor of Ladâk.
2nd ..	Lé.	$9\frac{1}{8}$	Road for 4 miles through the cultivated lands of Chachôt, thence for 1 mile stony to the bank of the Indus, which we crossed by two substantial bridges of poplar, the larger one being 80 feet in length, and 8 feet broad within the railings. From the bridge the road was alternately sandy and stony the whole way up an easy ascent to Lé.
3rd ..	Halt at Lé.	..	Observed the meteorological instruments hourly, and obtained meridian and equal altitudes of the sun.
4th ..	Ditto.	..	Observed the declination magnetometer hourly, and obtained meridian and equal altitudes of the sun.
5th ..	Ditto.	..	Ditto ditto.
6th ..	Ditto.	..	Observed the dipping needles, and Hansteen's intensity apparatus ; and obtained meridian and equal altitudes of the sun.
7th ..	Ditto.	..	Cloudy, no observations. Light snow fell.
8th ..	Ditto.	..	Cloudy morning and snow until 9 o'clock ; obtained meridian and equal altitudes of the sun and four observations of a Polaris.
9th ..	Ditto.	..	Obtained meridian and equal altitudes of the sun. The morning was cloudy with occasional breaks of sunshine. The beginning of the solar eclipse was therefore not obtained within half a minute ; and its termination was completely obscured : but the time of its greatest phase was accurately observed. Hourly meteorological obser-

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			vations were made during the morning: and during the eclipse the observations were made every quarter of an hour, to note the abstraction of heat.
10th Oct.	Thárú.	11¾	At 1⅛ mile from Lé reached the new fort on the plain built by Vazir Zorawar Singh. It is a square of 200 yards with round towers at the corners and in the middle of each curtain. The walls are built of huge sun-dried bricks;—they are about 20 feet in height, and are loopholed all round. The fort is well supplied with water inside, as it stands on the left bank of the Lé rivulet. There are 4 good 3-pounder brass guns with serviceable carriages and 30 well dressed artillery men. At 1 mile beyond the fort, passed a gibbet with the skeleton of a Boti-man hanging from it. He was executed six years ago by the Governor for killing a bullock. At 4 miles passed the village of Pitak. Just above this village there is an immense mass of indurated clay in horizontal layers, an undoubted lacustrine formation. At 9 miles crossed the Phiang rivulet leaving the village and monastery of Phiang one mile to the north.
11th ..	Bazgo.	1¼	Road over undulating stony ground for 3 miles; then a rough and sandy descent of 1 mile down a dry ravine to the level cultivated lands of Nyimo, a large scattered village opposite the junction of the Zauskar river with the Indus. Thence for 3 miles over barren stony ground to the fields of Bazgo and then throngh the cultivation to the village.
12th ..	Sáspúl.	8	Road for 1 mile through the fields of Bazgo: thence over barren undulating ground interrupted by dry ravines for two miles. Then down a

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			dry ravine and along the bank of the Lakiru rivulet to Sâspûl on the Indus, a pretty scattered village watered by two revulets.
13th Oct.	Hemistokpo	9⅝	Road along the right bank of the Indus for six miles barren and rocky to Urlétokpo, a small place of only 2 houses, opposite the village of Sgyéra, which has a considerable extent of cultivation. Thence the road continues along the right bank of the river, with some steepish ascents and descents for 3½ miles to a level spot opposite a small patch of cultivation with a few houses called Hemis-tokpo.
14th ..	Snurla.	5⅝	Road for 4 miles along the right bank of the Indus, level and occasionally very sandy. At this point the upper road viâ Hêmis joins the lower road viâ Sâspûl, and at 1½ mile beyond the large scattered village of Snurla is reached. Here walnut trees were first observed, but of no great size: the fruit however was large and good. Chakors were numerous; and the wild animal, half goat half deer, called Shâ, abounded on the opposite hills. I procured a fine large male with some difficulty.
15th ..	Bridge over the Indus.	8⅞	Road continued along the right bank of the Indus. At 4 miles passed Balukhar, a ruined castle on a low isolated rock. At 3 miles farther reached the village of Kallach, the Khalets of Moorcroft, who calls it one of the largest places in Ladâk. It has now only 19 inhabited houses: but I observed whole rows of roofless houses. Indeed I have observed the same at nearly every village in the Ladak territory from Giah to Lé, and from Lé to Molvil. At one mile beyond the village, crossed the Indus by a substantial

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			bridge 8 feet broad, 77 feet long, and 45 feet above the water. On the right bank there is a wall square bridge-head, built of sun-dried bricks, with a guard of 12 men.
16th Oct.	Lama yurru.	$8\frac{5}{8}$	Road for first half mile along the left bank of the Indus. It then turns to the southward up the right bank of a small stream, the Wanla chu, which at 2 miles was crossed by a sanga. The stream winds considerably, but its general direction is to the south. After crossing it twice more the road left the main stream, and proceeded up a narrow ravine which gradually opened out into a well-cultivated valley. I observed immense masses of a fine pale straw-colored clay in all positions from the bed of the river up to more than 1000 feet in height; and resting on the slate which stands at a highly inclined angle of nearly 80° after observing these undoubted marks of a large lake having once existed in this spot, I was much interested on hearing the Lamas of the place ascribe the founding of their Monastery to one Naropa, a Lama of Brigúng near Lhása, who drained the Lama Yurru Lake many centuries ago by cutting through the opposing rocks. The tradition is curious, as it may perhaps show that this lake must have existed at a comparatively late period; unless indeed we give the Lamas credit for rather nice observation and the consequent deduction.
17th ..	Heska.	9	Road for 5 miles an easy and gradual ascent to the top of the Pass called Photolá, 13,000 feet in height. Thence an easy descent of 4 miles to Heska; on the right bank of a small stream and bluff rock, above the village, there is a deserted Lamaic monastery.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
18th Oct.	Charak.	$11\frac{1}{8}$	Road good and generally level, with a few slight ascents and descents. Crossed the Kánji river five times by temporary bridges. At $5\frac{1}{2}$ miles passed Kherbo, and at 7 miles, Thakshé, both picturesque-looking places, situated on isolated cliffs. At 8 miles the road left the Kánji (which is said to join the Indus at Dah), and proceeded up a small stream to the westward; an easy ascent the whole way.
19th ..	Molvil.	$7\frac{1}{2}$	An easy ascent of $1\frac{1}{2}$ mile to the top of the Namyika Pass, 12,600 feet high. Thence a rather rapid descent of nearly 4 miles to the bed of the Waka chu; and then along the right bank of the stream through fields for 2 miles to Molvil.
20th ..	Halt.	..	Observed the declinometer and the meteorological instruments hourly from 4 A. M. to 4 P. M. and the dipping needles at $4\frac{1}{2}$ P. M. taking 16 observations of each needle.
21st ..	Dok.	$8\frac{3}{8}$	Road for 3 miles down the Waka river, through an open and cultivated country. It then crosses the Pugal river, and shortly afterwards the Waka, which narrows to a mere rocky torrent till within $1\frac{1}{2}$ mile of Dok where the cultivation again appears.
22nd ..	Kargyil.	$11\frac{3}{8}$	At $5\frac{1}{2}$ miles passed Paskyum with a fort on a projecting spur on the left bank of the Waka river, and the town on both banks below more than half deserted, but the lands well cultivated. At half a mile further crossed the river, thence passing several villages and much cultivation for 3 miles, the road ascended to a level stony plain and continued to the N. W. dipping at every half mile about 50 feet or more, and then descended nearly 300 feet to the junction of the Waka with the Suru

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			river. The latter is a considerable stream about four times as large as the Waka-chu. A road leads up its bed to Kishtwar. It was by this route that Zorâwar Singh first invaded Ladak.
23rd Oct.	NearKherbu.	$11\frac{3}{4}$	At $\frac{1}{4}$ mile crossed the Suru river by two small bridges and one large one. Just above the bridges, on the left bank of the stream, is a small loop-holed fort, 50 or 60 yards square, with round towers at the corners. It is well supplied with water. Below the bridge the Purik and Suru rivers unite. The road then continued for $2\frac{1}{2}$ miles to the junction of the Suru and Drâs rivers. From this point it turned to the westward up the right bank of the Drâs river, along which it continued for 9 miles to the encamping ground, a short distance beyond the junction of the Shingo and Drâs rivers.
24th ..	Jas-gund.	$12\frac{7}{8}$	Road for 7 miles continued along the right bank of the Drâs river passing the villages of Kherbu and Shimsha. It then crossed the river by 2 bridges, one of 20 feet span over a rocky channel, and the other of 50 feet span over the main stream. Thence for $5\frac{3}{4}$ miles up the left bank of the river passing Chibr and Taskyum. Snow fell during the afternoon.
25th ..	Drâs.	$7\frac{5}{8}$	Road nearly due west the whole way to the fort of Drâs, chiefly over alluvial soil, the deposit of former lakes. On a small piece of ground just after passing the hamlet of Styalbo, and within half a mile of the fort there are three upright stone pillars on the side of the road. The smallest of the three is undoubtedly a modern Sati stone with a modern inscription (in the Hill character) of which I have copies. The

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			other two pillars, familiarly called *Choms*, or the "Women," are also Brahmanical and not Buddhistical, for the almost obliterated inscriptions are in Kashmirian Nâgari, and not in Tibetan characters. I took copies of these inscriptions also.
26th Oct.	Matén.	11⅞	Road for 7¾ miles to the westward up the left bank of the river, to Pân Drâs, a Kashmirian corruption of Purâna Drâs, or old Drâs, to distinguish it from the new Drâs or Sikh Fort. Professor Wilson strangely supposes it to be Paien-i-Drâs or lower Drâs, although it is higher up the stream. Beyond Pân Drâs the road continued for 1½ mile to the westward up the stream and then crossed to the right bank by ford, and turning to the S. S. W. after 3 miles reached Matén. Snow fell heavily all the afternoon, and continued throughout the night.
27th ,,	Bâl-thal or "Hill foot."	15⅞	Road for 5 miles through snow up the right bank of the Drâs river; and thence across the stream and up a short steep ascent, and up the stream for 6 miles further to its source in the Waga-Sar; from which also issues, in the opposite direction, one of the sources of the Sindh river, which flows into Kashmir. This is properly speaking the Pass or dividing ridge between Ladak and Kashmir: but as the road afterwards ascends a spur of the hill beyond to a point somewhat higher than the level of the lake, the latter is considered to be the Pass, and is accordingly named so as the Seo-ji-la. From the Pass the road descends very steeply for rather more than 2 miles to a log-hut, at the junction of the Waga rivulet with the Kishen-Gunga, which is said to come from Amarnâth. This

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			spot is called Bâl-thal, literally "Hill-foot"—snow fell half the day.
28th Oct.	Sonamurg.	$8\frac{3}{8}$	Road down the right bank of the Sindh river a succession of slight ascents and descents occasionally through fine forest. At $6\frac{1}{2}$ miles crossed the Nila, a large stream. At $8\frac{1}{4}$ miles crossed the Sindh by a wooden spar bridge, 60 feet span, and encamped opposite Sonamurg, which has now only one inhabited house. Snow fell all day and night.
29th ..	Gagangir.	$7\frac{1}{8}$	Road for $1\frac{1}{2}$ mile level through deep snow. At $\frac{1}{2}$ mile beyond crossed the Sindh by a spar bridge, 60 feet span. Thence for 5 miles up and down steep rocky ruts, full of snow and mud; a most fatiguing and disagreeable march, snow falling the whole way. Around Gagangir great numbers of walnut trees. Snow during the day.
30th ..	Surbarâ.	$10\frac{5}{8}$	Road for 7 miles to the W. S. W. along the right bank of the Sindh, and through much cultivation to Gunda-Sarsing, where I observed the first rice-fields: thence to the S. W. for upwards of 3 miles to Surbarâ, crossing the Sindh 1 mile above the village.
31st ..	Kangan.	$9\frac{5}{8}$	At $1\frac{3}{4}$ mile crossed the river and continued along the right bank to the northward of west, passing the pretty village of Mârgund, to Kangan, a good-sized place with much cultivation.
1st Nov.	Gândar-bal.	$9\frac{5}{8}$	Road for 4 miles to the north of west along the right bank of the Sindh: thence across the river by a bridge of 57 feet span, and up a steep bank to an elevated table-land along which the road turned to the S. W. past the large village of Nunar to Gandar-bal. From the top of the ascent the Huri-purbut and Takhti-Sulimân to the east and west of the capital were both visible.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
2nd Nov.	Srinagar, Capital of Kashmir.	9¾	Road for* miles round the base of low hills and along the edge of rice fields. At Daran I noticed large masses of conglomerate resting on the rock. The road then ascended a level cultivated plain upwards of 100 feet above the rice-fields. At 5 miles near the village of Shur I was met by the Dewân Nihâll Chand and escorted to the city where I took up my quarters in Dilawar Khan's Garden. In the evening the Dewan waited upon me with a present from the Maharaja of 325 Hari Singhi rupees.
3rd ..			
4th ..			
5th ..	Halt.	..	On these days I observed the declination magnetometer and the dipping needle together with all the meteorological instruments. I also obtained four meridian altitudes and numerous equal altitudes of the sun. On the 5th I paid a visit of 2 hours to the Maharaja Golab Singh. He was particularly cordial in his manner, and he recounted to me all the leading events in the conquest of Ladâk and Balti and the invasion of the Lahâsan territory. He seemed particularly desirous to impress me with the belief that his last expedition was undertaken not only against his wishes, but in spite of his repeated orders to the contrary. On this occasion, I presented to the Maharaja, a box with a singing bird, and on my taking leave, His Highness waved a bag of 50 Hari Singhi rupees round my head. On the next day, the 6th, at the Maharaja's desire I dined in the Shergurhi, and spent 4 hours in conversation with His Highness. He was very communicative, and detailed to me the strength and disposition of his Military force, and showed me specimens of his mountain artillery, small
6th ..			
7th ..			

* Sic in MS.—Eds.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			pieces that can be carried either by men or by bullocks. They are called Shêr-bachchas and Bágh-bachchas or Tiger-cubs and Leopard-cubs. I requested permission to visit the different ruined temples in Kashmir, which was readily granted; and I then took leave of the Maharaja, who presented me with a large scarlet cloak lined with fine sheep skins.
8th Nov.	Pandretân.	3	Having sent a small boat to the tank in which the temple of Pandretan is situated, I was able to make a plan and elevation of this building, by measurement. It was built by the minister of Nirjita Vermma, in A. D. 920-921.
9th ..	Avantipur.	$11\frac{1}{4}$	Road along the right bank of the Behat, and through the celebrated saffron-fields to Pampur; thence over an elevated plain for four miles to Satapura (or Lalitadityapura), where the road again proceeds along the bank of the river as far as Avantipur. At this place I found four ruined temples, two of which were built by Avanti Vermma, and two by his minister. Two of them are now mere heaps of rubbish. I made a ground plan by measurement of one of the two other temples, and left money to pay for excavating a part of the earth that had silted up the columns of the peristyle of the fourth temple.
10th ..	Bij Bihara.	$10\frac{3}{8}$	Road for 7 miles up the right bank of the Behat, and thence across the river by ferry. There are no ruins about Bij Bihara worth visiting, and the only inscription has been almost defaced by the Musalmans. The present town is built on the debris of the former city; for the lingam, called Ladhaswa, or Kishteswar, is now 15 feet below the level of the ground on which the surrounding houses stand.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
11th Nov.	Bhomaju.	$7\frac{1}{8}$	From Bij Bihara, the direct road to the caves of Bhomaju crosses the Lidar, or Lambodari river by ford to the large village of Bhawan, beyond which, at one mile, are the caves. There are but two caves worth mentioning, of which one is a long narrow natural fissure, leading to two or three cavities, each about 20 ft. in diameter. The other cave is no doubt partly artificial. It contains a small temple without any image. I made a plan and elevation of this building by measurement with considerable care; as it appeared to me, from the simplicity of its style to be the oldest temple in Kashmir. The whole surface of the temple was literally swarming with bugs, which made the measurement an extremely unpleasant task.
12th ..	Marttand.	2	Road through the pretty village of Bhawan, from which a steep ascent leads to the celebrated temple of Marttand, situated at the upper end of the extensive Karewah or elevated plain of Matan or Martan, the Kashmirian corruption of Marttand, मार्त्तण्ड, one of the names of the sun.
13th ..	Halt.	..	I halted the next day for the purpose of completing the measurements and drawings of this fine specimen of Kashmirian architecture. I do not, however, attribute any great antiquity to it, for it appears to me almost certain that it must have been erected at a later period than the temples at Avantipur, the columns of which have plain cubic bases. I made a ground plan of this temple, an elevation of one of the porches, with the adjoining columns of the peristyle, and views of the interior and exterior.
14th ..	Bij Bihara.	10	I returned to Bij Bihara over the plain of Matan, which, instead of being destitute of trees, as described by Vigne and Hugel, has upwards of 500 trees

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			upon it, a single clump of more than 50 trees being within half a mile of the temple. At Bij Bihara I copied the mutilated inscription, and examined the Chakradhar hill, which has once been covered with buildings. Its north-western end has evidently been a fort, cut off from the main hill by a broad deep ditch, which still exists.
15th Nov.	Avantipur.	$10\frac{3}{8}$	At Avantipur I made a plan of the second existing temple, and an elevation of the peristyle from a perfect portion, from which the silt had been excavated during my absence by my direction and at my expense. This portion had evidently been silted up before the Musalman ascendancy in Kashmir, for the human headed birds which surmounted the capitals of the pilasters of the archways, are still perfect.
16th ..	Ratanpur.	10	From Avantipur I crossed the Behat and proceeded over the extensive Karewah of No-naga, (an admirable spot for the measurement of a base line of survey,) which is a perfect level 5 miles in length, with an average breadth of from 1 to 2 miles. On the opposite side of the Karewah I stopped for half the day to make a plan and elevation of the almost perfect little temple of Payachh, after which I proceeded to Ratanpur.
17th ..	Pândrîtân.	12	At 2 miles I reached Kakapur, on the left bank of the Behat, where I examined the remains of two Hindu temples. From thence I proceeded by water to Pampur, where I made measurements of the remains of a small temple, of which one column of the peristyle is still in beautiful preservation. I also copied the short Sanscrit inscription which I had myself discovered when I passed through the town on my way up the river. I then continued my route to Pândritân,

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			where I completed my drawings of the temple, and made sketches of several gigantic columnar fragments, which I believe to have once formed a single column, 7 feet in diameter, and upwards of 50 feet in height.
18th Nov.	Srinagar Capital of Kashmir.	3	I ascended the Tahkt-i-Sulimân on my way to the city, and made a ground plan of the temple, and an elevation and section of the surrounding wall and doorway. This specimen is particularly valuable, as it is almost certain that the temple was built by Raja Jaloka, about 220 B. C. The surrounding wall is extremely simple in its design, and I think I shall be able to show that it is the earliest existing specimen of the Kashmirian order, from which, by successive additions and improvements, the beautiful peristyle of Marttand was at length gradually evolved.
19 to 23rd	Halt.	..	On the 19th I set up the Declometer and the Meteorological instruments which were observed on the following days, as well as the Dipping-needle and Hansteen's Intensity Apparatus. On the 22d I was to have taken leave of the Maharaja, but as he was ill on that day, my visit was necessarily postponed until the 23d, on which day I paid a farewell visit of three hours to His Highness, and received from him a khelat of 13 pieces for myself, and a present of three pieces, with a letter for my brother, Capt. J. D. Cunningham.
24th ..	Vichâr-nâg.	3	I made a short march this day that I might have leisure to inspect the buildings and ruins about the city. I first visited the tomb of Sultan Zein-al-âbidin's mother, close to which is the surrounding wall of an old Hindu temple in good order. From the simplicity of its style, it is undoubtedly of great anti.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			quity, only inferior to the temple on the Takht-i-Sulimân. I next visited the Juma Masjid, to verify the corrections of my ground-plan, which makes the number of its pillars to be 402. I found my plan quite correct. Beyond the present city, amidst the ruins of the various Mohallahs of the No-shehra, or new city of former days, I found numerous columns and vestiges of Hindu temples attached to Muhammadan mosques and tombs. But the most interesting was that of a figure of Buddha, and three short rude inscriptions of a few letters, each in the *Tibetan* character. I can only account for the occurrence of Tibetan letters by supposing that there formerly existed on this spot a temple built by Raja Rinchana, the Ladâki conqueror of Kashmir, just previous to the Muhammadan period.
25th Nov.	Mânasabal.	13½	Road for 3½ miles along the edge of the Karewah of Pandachye; thence across a swamp for 3 miles, to the Sindh river, which I crossed by boat near the remains of a masonry bridge, of which 5 arches are still standing. Beyond this, for three miles, the road lay through low ground, occasionally swampy, to the village of Bhoosa, on the edge of the Karewah, at the foot of the Ahathyung hill, thence round the south and east sides of the hill to the Mânasa-bal lake. In the afternoon I ascended the hill and picked up hundreds of univalve shells, all of one species. The highest point at which I could discover any shells was 6,188 ft. above the level of the sea, or upwards of 850 feet higher than the present level of the Jehlam, and 118 feet higher than the temple of Marttand, which stands on the upper end of the Karewah of Matan, the highest alluvial land in the valley

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			These two data will give a height of about 6,200 feet for the surface level of the original lake, or Sati-saras, which must therefore have been at least 900 ft. deep. I was unable to discover any specimens of these univalve shells in the present waters of Kashmir, but I procured specimens of three varieties of existing shells, two univalves and one bivalve, and I am happy to add that I found numerous old specimens of the bivalve in the alluvial formations of Avantipur, at least 200 feet above the present river. This fact proves that a fresh water lake, 200 feet in depth, formerly existed in Kashmir, the waters of which must have covered the whole of the valley excepting the Karêwahs, or elevated table-lands, which are themselves of alluvial formation.
26th Nov.	Pathan.	10¼	The road first crossed the Behat or Jehlam at Sim-bal, by a bridge of five arches, where the river was 340 ft. broad. It then proceeded by a devious course, skirting swampy ground the whole way to Pathan. At this place I made ground plans of the two existing temples, which are similar to those at Avantipur, but much inferior to them, both in size and in their ornamental details. They were both built by Sankara Vermma, who reigned from A. D. 883 to 901. The one was named Sankara-gaureswara, after himself, and the other Sugandheswara, after his Rânee, Sugandhâ.
27th ..	Sopur.	12	Heavy snow having fallen during the night, and there being no prospect of the weather clearing up, I made my way with much difficulty through deep snow to Sopur, on the river.
28th ..	Baramula.	10	Snow continued falling the whole night, and I proceeded by water to Baramula, which received its name from the Vara-

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			ha-Ganga, a small tank, which still exists in the town.
29th Nov.	Piran.	$6\frac{1}{2}$	As the snow still continued falling, and the winter appeared to have set in, I judged it best to leave Kashmir at once and proceed to Mozafarabad.
30th ..	Gingal.	$8\frac{7}{8}$	Road throughout extremely difficult owing to the depth of the snow.
1st Dec.	Halt at Gurgal.	..	Halted for want of coolies—snow fell the whole day and throughout the night.
2nd ..	Sultan Dakka.	11	Road down the right bank of the Jehlam. Snow and rain during the day.
3rd ..	Kathai.	$12\frac{3}{8}$	Road continued along the right bank of the river—rain again during the day.
4th ..	Baliasa.	$6\frac{1}{2}$	Road as before. Heavy rain throughout the whole day and night. A short mareh to allow time for my missing baggage to come up.
5th ..	Khânda.	5	Another short mareh part of my missing baggage reached me at this place. Rain during the day and throughout the night.
6th ..	Hetiah.	$10\frac{5}{8}$	Road better to-day and the valley of the Gehlam more open. Light rain during the day.
7th ..	Halt.	..	Halted for my missing baggage which did not arrive until late in the evening.
8th ..	Mozafarabad.	$14\frac{1}{4}$	Light rain again. Road generally level and through much cultivation.
9th ..	Halt.	..	Halted for coolies and for observations of the sun, although the day was very cloudy.
10th ..	Garhi.	$8\frac{3}{8}$	Crossed a pass into the territory of Maharaja Dilip Singh. Rain fell again in the valley, and the hills were covered with snow as well as the Pass.
11th ..	Mansera.	15	Heavy rain throughout the day and during the whole night. Roads exceedingly slippery over a clayey soil.
12th ..	Halt.	..	Halted to make arrangements for fresh coolies. Heavy rain throughout the day until 5 P. M.

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
13th Dec	Nowasheh-ra.	14	Road more level and open than before. At 6 miles passed an octagonal tope built on a square base with arched recesses on each side, showing it to be of a very late date certainly posterior to the Mahomedan conquests.
14th ..	Chamba.	14	Road extremely muddy and slippery for 3 miles; then down the bed of a stony Nullah and over level cultivated fields to Chamba. On the road I noticed several Hackeries, a sure sign of a level country.
15th ..	Haripoor.	12	Road good through an open and generally level country well irrigated. Received a present of 125 rupees from the Sirdar Chet Singh.
16th ..	Sultanpoor.	13	Road good down the left bank of the Haru river.
17th ..	Hazru.	18	Crossed the Haru at 3 miles, thence through ravines and low hills for 9 miles, and over the beautifully cultivated plain of Chach to Hazru.
19th ..	Halt.		During these days I was suffering from acute rheumatism, brought on by exposure during 16 days of snow and rain without a tent, on my way from Kashmir. Two of my servants were likewise so ill, that they could not be moved even from Hazrut to Shamsabad, a distance of only 6 miles.
20th ..	Shamsabad.	6	
21st to 23rd	Halt.		
24th ..	Ohind.	9	Crossed the Indus by a capital ferry to Ohind, one of the most ancient cities in this country. The sands of the river are washed for gold. The washers likewise find numerous old coins and trinkets.
25th ..	Nogram.	16	Road skirting the hills on the northern edge of the Yusufzai plain. I was surprized to find the whole country from Ohind to Hastnagar one vast plain, instead of a hilly tract as it is represented in all the maps, excepting only that of General Court. This plain has once been thickly populated: for the remains

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			of large villages are numerous, and water is at no distance from the surface. So scanty however is the cultivation at present that the people import both wheat and rice from Swat, in exchange for which they give coarse sugar, and cotton and woollen cloths. In the afternoon, I ascended the hill to the Fort of Rani-gat which I believe to be the Aornos of Alexander.
26th Dec.	Maneri.	7	In the morning I again ascended Rani-gat and made several measurements, as well as a rough sketch of the Citadel.
27th ..	Shamsabad,	18	I returned to Shamsabad to make inquiries from Lieut. Robinson of the Engineers about several places of which I had heard only confused accounts.
28th ..	Halt.	..	Halted to make arrangements for another visit to the Yusufzai district.
29th ..	Bazar.	10	Crossed the Indus at an island by two ferries; the stream on the right bank running very strongly.
30th ..	Ali Mahomed.	10	Proceeded to Lieut. Lumsden's camp near Akord, to ascertain what parts of the Yusufzai country were safe for travellers, and to learn from him whether there were any ruins or inscriptions worth visiting.
31st ..	Turu.	11	Over an uncultivated plain, which has in former times been a luxuriant sheet of cultivation.
1848. 1st Jan.	Chargolai.	13	Visited the Shahbag-garhi inscription, and passed into Chargolai to make inquiries about the Kashmiri-garh, a cave which is said to have its exit in Kashmir. I found it was not worth visiting.
2nd ..	Shahbag-garhi.	7	On these days I made a copy, with much difficulty, of the most legible portion of the great inscription. A proper copy can only be made by levelling the ground and building up platforms, and by whitewashing the surface of the rock,
3rd ..	Halt.	.	

Date.	*Halting place.*	*No. of miles.*	*Remarks.*
			to bring out the sunken letters. Such a work would occupy a long time; but it would well repay the labour. I copied the greater part in a standing position, on sloping ground.
4th Jan.	Lahor.	18	Over the Yusufzai plain, passing only one large village, named Yar Husen, and a small one, named Sudher.
5th ..	Shamsabad.	12	Crossed the Indus by the Ohind ferry.
6th to 8th			Halted to make arrangements about camels, guards, &c.
9th ..	Burham.	14	Country much broken by ravines, and almost wholly uncultivated.
10th ..	Hasan Abdal.	7	Road through broken ground. Around the town there are some fine level sheets of cultivation.

(Signed) A. Cunningham, *Capt.*
Commissioner, Tibetan Frontier.

(True Copies)
J. Lawrence, *Officiating Resident.*

Short Survey of the countries between Bengal and China, showing the great commercial and political importance of the Burmese town of Bhanmo, on the Upper Irawady, and the practicability of a direct trade overland between Calcutta and China.—*By* Baron Otto des Granges.

The direct distance between Calcutta and the Chinese frontier of Yunnan is about 540 miles, nearly the same as that from Calcutta to Agra. The road which we have to travel admits of three sub-divisions, part first falling in Bengal, between Calcutta and Silhet; part second in the independent states of Cachar and Munipur, and part third in the Burmese empire.

Part first, from Calcutta to Silhet, is known, and on the whole distance river communication is open at all seasons.

Part second, up the Barak river (in Silhet called the Surmah) through Caehar. This Caehar, with the capital of Khaspur, borders east to Silhet, and is governed by an independent Raja. The Barak river runs through it, and is navigable as far upwards as Kalanaga Ghat, but in the dry season only as far as Talayn, where rapids interrupt the passage. The ground rises gradually towards the east to the Khainbunda mountains, which separate Caehar from Munipur. These mountains consist of several, from north to south running chains in a breadth of 40 miles, which are not above 4,000 feet high, and over which a road has been made by the Government of Bengal. Their Eastern foot rests on the table-land of Munipur, which has an elevation of 2,500 feet above the sea, and which is on all sides surrounded by mountains. This territory belongs also to an independent Raja, residing at the principal town of the same name, who, however, like his neighbour of Khaspur, is placed under the inspection of a Company's Resident. Our road lies across this elevated plain towards its eastern boundary, which is a range of hills called by some geographers the Mirang mountains. Over these we have to cross, then to descend to the Kubo valley, and to the above-mentioned Ningthi river, on which we reach Monfoo, the first Burmese frontier town.

On our road from Calcutta we have found river communication for the greater part of a direct distance of 250 miles to Silhet, and still further on for 65 miles to Kalanaga Ghat. From this place to Monfoo are only 105 miles, and we have to cross the Khainbunda mountains in a breadth of 40 miles, on good roads, then to traverse the Munipur table-land 30 miles broad, on more level ground, and finally over the Mirang hills to Monfoo on the Ningthi river, 35 miles.

The people which we meet on this track east of Silhet differ from each other according to the nature of the country which they occupy. They are first, the inhabitants of the low country, the Cacharees; secondly, of the higher Munipur, and thirdly, of the hills surrounding that table-land. They are all quite different from the Bengalees, and belong to the same group of Eastern Asiatic races as the Thay and Shan, the Burmese and Siamese. The occupants of the mountains round Munipur are the Nagas or Kookees. They are a free, independent and very active people, who, poor and separated from all cultivated countries around, have remained unsubdued by more powerful neighbours. They

build their villages on the most inaccessible ridges and mountain tops are of great muscular strength and indefatigable mountaineers. As such they will prove the best carriers for the transport of goods across their mountains—the Bugarrees of the East.

Part third—from Monfoo, on the Ningthi river further east to the Irawady are 70 miles direct distance. Of this part of our road we possess no information, and no European traveller has visited this country. Yet from the configuration of the whole peninsula we can conclude that it is filled up with parallel mountain chains running from north to south, of no considerable elevation and opposing no great difficulties to our progress. On the Irawady, about Kutha Mio, under the 24th degree of north latitude we meet with the great Caravan route leading from Ava to Yun-nan, and we go up the navigable river as far as Bhanmo, from where the road to Yun-nan runs in the valley of the Bhanmo, Roving (river) a tributary to the Irawady. This Bhanmo is the most important town of Northern Burmah; it is the emporium of its trade with China, and annually, twice, at the beginning, and at the end of the dry season, a Chinese caravan arrives here, selling all the goods here, whilst only few merchants proceed to Ava. This market has been frequented since the earliest centuries, and formerly even to a much greater extent, than now, since the comparatively recent invasions and conquests of the Mranmas or Burmese, have interrupted the trade. Marco Polo, the famous Venetian traveller, who as an envoy of the Mongol Kublai Khan, visited these countries at the end of the 13th century, is the first who gives us some information of this market, and of the road leading from here into Yun-nan. The commerce transacted here is still considerable, and consists principally in an exchange of the various produces of Yun-nan, and neighbouring provinces of China, for those of Burma, and the more northern countries of the Bhor Khamtees, the Mismis and Sing Phos, as far as Assam and Tibet. The articles of trade, as given by Crawfurd, are the following:—

1. Exports from China.—Copper, Auripigment, Mercury, Cinnabar, Alum, Tin, Lead, Silver, Gold, Chinaware, Pictures, Ironware, Carpets, Rhubarb, Tea, Raw-Silk, Velvets, Honey, Musk, Paper, Fans, &c. Raw Silk and Tea are the greatest items, the former to the amount of 27,000 bales.

2. Imports to China from Burma, are Cotton, upwards of 75,000

bales edible Birdsnests, Ivory, Horns, Precious Stones, and British manufactures.

The whole exchange is estimated by Crawfurd from half a million to £700,000 annually.

Looking on the map of this part of Asia, it will at once appear surprising that a direct intercourse should never have existed on our route between India and China, and that the trade which concentrates at Bhanmo, should not have extended to Calcutta across these countries, which, as we have seen, are in all parts accessible, and which offer even many facilities for the transport of goods, and only the fact that the political state of these countries has been always very unsettled, especially since the Burmese gained the ascendancy, accounts for it in some degree. Yet is the way which we have described the only one that leads from India to China, and which connects both countries just at the point of their nearest approach to each other: it is thus the only road on which possibly any direct intercourse between both countries ever can take place, since in all other directions they are separated by the highest mountains and far greater distances: and if we look upon a direct trade between India and China as an object of the highest commercial, as well as political importance, we will give due weight upon the following points, which appear to render it easily practicable.

1. That there is water communication for a direct distance of 250 miles from Calcutta to Silhet, and further on for 65 miles to Kalanaga Ghat.

2. That from this place to Munipur, a road is made, and that there exist no difficulties in crossing the remaining part of the country to Bhanmo.

3. That the extensive trade which is carried on at present at Bhanmoo, offers a very favourable opportunity for opening commerce with the Chinese and to extend the same to Calcutta.

4. That the market place for this new trade would be at Silhet, consequently in our own territory.

5. That the land transport from Bhanmo to Silhet would devolve on the Chinese, and that we would only have to go to Silhet by water.

The spirit of enterprise of the Chinese is well known; wherever they find security and profit there they resort to, and they will easily overcome the difficulties of the land transport between Bhanmo and Silhet, in

which perhaps any European would be less successful. On this probability that we need only go as far as Silhet, and that the Chinese will come there, so that Silhet would become the market place for the trade, rests the likelihood of success in any attempt to open a direct commerce between China and India, and every Calcutta merchant will enter more freely in this speculation, if he considers that the depôt for his goods will be on British territory, and at a place to which he can transport the same securely by water and at little cost. What articles of trade would be the best suited for this commerce, and what profit could be realized, only experience and a better examination of the produces and requirements of these countries can show. Most likely that Opium and English woollen cloths would be in good demand in the interior of China, and that Tea, Raw Silk, but especially the minerals, as Silver, Gold, Auripigment, Copper, &c., of which Yun-nan is said to be very rich, will turn out as profitable purchases on our side.

But it is not to be expected that this commerce could be established at once, and that all the resources of the countries east of Bengal, and of interior China would flow at once into our channel of trade to be discharged at Silhet; on the contrary, we wish only to draw the attention of the Calcutta merchants and those connected with this place, upon these countries, to convince them, in showing how great a field for profitable enterprize still remains unexplored, that they deserve to be better examined, and that the advantages which they offer to commerce justify a first attempt to open the same. And this so much the more, as it could be done under a trifling expense, simply in this way, that (at least) two travellers, who are acquainted with the character of the natives and with the *Burmese* language, be sent to *Bhanmo* either by way of *Rangoon* and *Ava* up the Irawady, or by our route over *Silhet* and *Munipur*, for the following purposes :—

1. Of ascertaining the mercantile relations of the countries around *Bhanmo*.

2. Of entering the Chinese province of *Yun-nan* to examine its geological formations and mineral wealth.

3. Of entering into negociations with the Chinese merchants at *Bhanmo* and to induce them to come over to *Silhet*.

There are no extraordinary difficulties in the attainment of these objects. The most difficult part would be to enter *Yun-nan*, which in case


Pl 1
BENGAL
MUNNIPOOR
BURMA
Sylhet
Munnypoor
Dacca
Comillah
Chittagong
Aracan
Ramree
Mogaun
Bamoo
UMMERAPOORA
Ava
Pagahm Mew
Rammthayn
Yongtchangfou
Aracan R
Burrampooter R
90
95
100
25

it should be found impracticable, is not absolutely necessary for the ultimate success of the enterprise, as the Chinese caravan would be found at Bhanmoo. To go up the *Irawady* to *Ava*, has been always permitted to Europeans, and the time for doing this is favourable now, because the present Court of *Ava*, since the dethronement of *Tharawady*, appears to be more friendly towards us. At *Ava* it would be of the greatest advantage to secure the good will of the Chinese merchants there, since their jealousy would occasion the greatest difficulties, and because only under their protection it would be possible to enter *Yun-nan*. Besides the great object is to induce them to come over to *Silhet*, for they would soon calculate what profit a trade with *Calcutta* offers them; more would come the next year, and thus a regular caravan trade to *Silhet* might become established. For this purpose our travellers should be provided with a sufficient supply of articles for trade, the profit from the first sale of which might cover to some extent the expenses of the whole enterprise, which therefore would amount to nothing more than the remuneration due to our travellers, and this cannot be thought much, in comparisou to the great and important object which may be obtained.

London, September, 1847.

A few observations on the probable results of a Scientific research after Metalliferous deposits in the Sub-Himalayan range around Darjeeling.—By R. H. Irvine, *Esq. M. D.*

The whole of that portion of the Sub-Himálayan range amidst which Darjeeling is situated, as well as neighboring portions explored, exhibit the greatest similarity of aspect, the ridges being exceedingly steep, and rising from their bases at an acute angle; the main formation being primitive, thè matter gneiss rock, displaced and disintegrated, and in most places not perpendicular, covered with a more or less deep deposit of alluvial soil, varying from a light yellow, to a stiff black loam, over which surface the main rock frequently crops out, and amidst which occasional deep beds of very stiff blue clay are found, such as underlies the London basin, and which so frequently appears at low water, amidst the sands on the coast of Kent. In the blue clay of this region, however, marine shells have not yet been discovered.

Though nearly the whole formation is gneiss, that rock is very seldom found horizontally stratified; indeed I never myself remember so seeing it: but has everywhere undergone displacement, as might have been expected, from the acute angle at which such lofty mountains rise.

A variety of minerals exist at scattered distances; but nowhere in such quantities, as to impugn the fact of the general character being gneiss rock. Besides iron ores, in rolled masses, of a silicious kind, which are not unfrequeutly found, I have heard of no metallic minerals having been as yet discovered. Graphite or black-lead ore, which is found very abundantly, is the only one of the least importance, that I have heard even alluded to.

The general gneiss formation is however of a highly metalliferous description; and the very same adjoining, and probably continued formation, is in Tibet, at higher elevations, known to be as far as explored, very productive in metals; while the yet unexplored is prodigious in comparison to that known at all.

At the foot of this portion of the Sub-Himalayan range, where the rivers pass out, there are few deep alluvial deposits; the rapid currents frequently carrying far below, and distributing over a vast space, all finer particles; the Balasun and Mahanuddee are the only rivers as yet well known at their exits from the hills; and no gold washing has ever been known to have occurred there; nor have any minerals of value been found, except carbonate of lime, in the shape of travertin, and tufa. Fine aluminous iron ore is however found amongst the Morung hills; and copper ores have also there been extracted, though the sites are now unknown.

With the exception of the absence of volcanoes, the Himalaya range, as far as known, consists in the main body of the very same mineral matter, as constitutes the chief nidus of all the valuable metallic ores found amidst the cordilleras of the Andes; the gneiss of the former only differing in an after process of nature from the granite and syenite, of the latter; while the Sub-Himalayas are covered with alluvial, and the Andes with green stone, and amygdaloid, basalt, and other trap formations.

It would seem not improbable, at the time that the quartz, felspar and mica forming the body of the Andes, were undergoing the cementing process in a semi-fluid state at a vast depth, and consequently

under enormous pressure; when the most subtile gasses must have been liquids or even solids; that the metals were reduced to oxides or sulphurets, from hitherto unknown matrices, and distributed in veins throughout the granular masses; and thus when along with them upheaved by volcanic forces, portions were reduced to the metallic state, especially the gold, when again exposed to intense heat, under a pressure that permitted the gasses to escape.

It will be seen from the nature of the gneiss of the Himalaya range, in which Darjeeling is situated, that similar forces have been even more recently at work, and reasoning *à priori*, we may conclude that only want of proper exploration, has prevented the discovery of metalliferous veins.

It is clear that the most easy source of all gold deposits is alluvial; a natural effect imperfectly imitated in obtaining the pure metal, from the solid granite; and in all countries where gold is found, in alluviæ, these are of course first exhausted before search is made in harder materials, through the original source. In that portion of the Himalayan hills however now spoken of, no gold or other metal can be expected to be found in the alluviæ so generally covering them; as that alluvia must have been deposited at a time when the gneiss forming their mass, was horizontally stratified, at a probable great depth, under superimposed fresh water, and when no great hills existed, from which metalliferous detritus could have come. In a similar way, even if gold does exist in the lower ranges, that metal will not be found in the alluviæ of the minor rivers, owing to their rapid changes and sporadic distribution.

In the vast alluvial deposits containing gold in other countries, the torrents of the surrounding hills have for thousands of years, poured them down, while natural basins existed to retain them, and this forms one great difference of feature between the Himalayas, as yet known, and the Andes.

On the whole southern side of the Himalayas, as yet explored, no elevated plains are known to exist, while amidst the declivities of the Cordilleras, plains are often presented of immense altitude, completely level, and of vast extent, and which have retained the gold and other heavy deposits, washed down from the mountains.

On the northern and Thibet side of the Himalayas, similar vast plains occur; and amidst these very thinly inhabited and hardly

known regions, very valuable deposits of metals have been found, and it is very certain that the identical rocks, in continuation from the detritus of which gold is extracted, in Thibet, form also the site of Darjeeling; the whole being primitive, and chiefly of gneiss formation; it has generally been found, that when alluvial deposits containing gold have been exhausted, all further search for that most valuable mineral amidst the hills from which the alluviæ had been originally washed down, has been in vain; and hence the conclusion usually come to, has been that deposits of gold, in metalliferous rocks, are extremely superficial; and doubtless this conclusion is generally correct; but not universally applicable; as is proven by the depth of the Veta-Grand mines in Mexico, being 310 fathoms; and in Potosi, where silver penetrates a hill 18 miles in circumference, to the greatest depth explored.

Though gneiss is the main formation of these hills, especially in the lower elevations, doubtless many other masses of transition rocks exist higher up.

Throughout the whole plain of India, from Bengal to the bottom of the deep wells in Jessulmere, and under the mica and hornblende schist of Ajmeer, the same kind of very hard fine-grained blue granite is found in solid and rolled masses; and this granite must form the real basis, and underlies all the other strata of the Himalayan mountains. In all the mountains around Darjeeling, the gneiss is apparent; but from the appearance through a telescope, the more elevated naked rocks seem to be solid granite and syenite.

The granite, gneiss, and mica slate of the Andes are generally covered by transition rocks, porphyry green stone, amygdaloid, basalt and other trap formations. In the province of Oaxaca granite and gneiss are rich in silver and gold; and also in many other regions; but neither granite, gneiss or syenite, are by any means the richest in metals; on the contrary, throughout the Cordilieras of Mexico rich metallic veins are found in a great variety of rocks, and the deposits, which furnish almost all the silver imported from Vera Cruz, are primitive slate grey wacke, and Alpine limestone. The richest of all silver mines is in primitive clay slate, passing into talc slate. The silver mines of Potosi in Buenos Ayres are contained in primitive clay slate, and the richest of those in Peru, in Alpine limestone. Many of the richest metalliferous veins are found to traverse Alpine and Jura lime-

stone, and conglomerate throughout Mexico; where also graywacke is very rich in metals; the metalliferous rocks also abound in hornblende; and the porphyries are very rich in gold and silver. There is scarcely any variety of rock that has not been found to contain metals; and in South America especially, the richness of the veins, is for the most part totally independent of the nature of the beds they intersect.

In Potosi, the richest mines are at a vast elevation, the strata chiefly composed of a yellow, firm, argillaceous slate, with veins of ferruginous quartz, which constitute the matrix of the silver.

Reasoning from the above facts, it would appear that we must only expect to find veins of the precious metallic ores, at elevations very superior to Darjeeling, and that we must first discover and explore those regions, where transition rocks overlay the gneiss, granite, and syenite.

Doubtless the gneiss, at elevations equal to Darjeeling, and even less, also contains metallic veins, especially as the rock, from the abundance of hornblende, coincides in character with the Cordillera gneiss; but all the streams being destitute of gold deposits, prove that there are no superficial veins of that metal. By proper search lead, combined with silver, would very probably be found.

The total absence of Volcanoes does not militate against the hope of discovering metalliferous veins, as the Ural mountains, rich in metals, are as destitute of volcanoes, as the Himalayas.

The sub-stratum of the whole of the mountains around Darjeeling, must be considered of a primitive and metalliferous character, being chiefly hypogenic gneiss rock. I am convinced that abundant veins of copper, lead, and iron ores, will be found at low elevations; and that native gold, and sulphuret of silver, will be found in the higher regions, as throughout the elevated land of Thibet, gold is an abundant production, in the debris of rocks of similar stratification, forming the alluvia of the rivers, while œthiops-mineral or proto-sulphuret of mercury, is also there abundantly found.

The snowy range forms the barrier to each region, and the formation being integrally the same, it is far from probable that ores are only confined to the north-eastern aspect,—the probability being in fact, that the facility with which abundance of the precious ores are found in Thibet, solely arises from the face of the country, which is almost destitute of wood.

In Thibet, the soil is generally barren, and unimprovable, but the country abounds in mineral wealth. Gold has there been found in great quantities, and frequently very pure; occurring sometimes in large masses, but generally in irregular veins; it is also found in the beds of rivers, and often broken off, with every appearance of having been a large mass. Mercury, lead, copper, and iron also abound, as does rock salt. The great want of Thibet, is wood and coal to fuse the metals; while on the south-western aspect, fuel is superabundant; and were a good mule road only once established, through any pass in the Himalayan range, those native ores could be brought to Darjeeling, and there smelted to great profit.

In Russia and Siberia, up to a late period, only two gold mines were known in the government of Tobolsk. But since the discovery of the great deposits in the Ural mountains, the produce of gold and platina has become very great. The cold and mountainous regions of Siberia, are the great depositories of those vast stores of mineral wealth, by which the Russian empire is encircled; and the alluvial plains rich in gold and platina, are of considerable elevations; but the Ural mountains, the mines of which are the great modern sources of Russian riches, are in height and appearance not unsimilar to the hills around Darjeeling, varying from 3,000 to 7,000 feet above the level of the sea, and abounding in dark woods suited to the latitude, and in numerous streams, having a gloomy but not bare appearance. The Ural mountains, locked in by ridges, with the great Altaic range, divide Europe from Asia, for 1,500 miles; and almost wherever explored, have been found to be metalliferous. In other respects they also resemble the great Himalayan range; with which, through Tartary and little Thibet, by the great and little Altaic Ranges, they communicate, as it has been observed; that with trifling exceptions all the auriferous deposits have occurred in the eastern or Siberian side of the Ural. The body of these Siberian mountains appear to be granite, gneiss, and syenite; but overlaid, as in the Andes, by transition rocks; especially porphyry, jasper, and serpentine.

The most easy source of gold, is of course in a local detritus, such as form the chief origin of the Russian and Brazilian wealths; which detritus Sir R. J. Murchison describes as a shingle rather than sand; but on the south-western aspect of the Himalayan range as hitherto

known, we must search for the matrices of the precious metals, as there are no auriferous alluviæ.

A very probable reason, why auriferous alluviæ are not found amidst the Cis-Himalayan hills, is, that besides the absence of plains, to serve as dams to the streams, the whole surface of the mountains is covered with tangled close vegetation, that prevents the rains cutting away the soil and carrying much detritus down the streams.

In eastern Siberia, where the richest alluvial deposits exist, the surrounding low hills, from which they have been washed down, have been found to be composed, geologically, similar to the eastern flank of the Ural, so abounding in ores ; and it is most probable that most of the transition series overlaying primitive strata, throughout the great central Asiatic chain, will be found more or less metalliferous. Baron Humbolt pointed out that rocks similar to those so richly auriferous in the Ural, re-appear in various parallels of longitude, along the whole line of Altai.—Both in Siberia and South America, granite and gneiss alone, often contain rich veins of gold and silver ores.

Captain Newbold ascertained that auriferous veins and deposits exists at various points in Hindustan, extending from north to south.

Sir R. J. Murchison states that in the Ural, Siberia, as in Mexico and South America, green stone syenite and serpentine, appear invariably to have been the agents by which the metamorphic rocks have become auriferous, and that as the structure of the Taurus, and its spurs, of the Amanus, and Kurdistan mountains, is precisely similar, there is every reason to believe, that gold will be found scattered throughout western Asia ; and as similar rocks contain gold in Kamtschatka, they are therefore in all probability continued throughout all the great primitive ranges of Asia.

It has been well remarked that so far as regards our own material interests, the great augmentation of precious metals in Russia, should be met by increased activity of research on our parts, by qualified persons in Hindustan, as well as other British dependencies.

Should metallic ores ever be discovered at, or around Darjeeling, either in our own or any native state, a rapid increase of population would ensue ; and in working such mines, one great advantage would arise from the remarkable disintegration of the gneiss rock, which could

be blasted with great ease ; and also in the abundant supply of water, wood and charcoal.

The disintegrated nature of the gneiss of the Sub-Himalayan range, must have been produced by sudden exposure to currents of water or vapor, when under pressure at a vast depth, and when intensely hot previously to elevation above the level of the sea, and long previously to the deposit of fresh water alluvia, with which the whole mass is more or less covered.

The ridges at and around Darjeeling are very steep and narrow, and it would be well worthwhile to run a few narrow galleries through the hills at as an acute an angle as possible, to the dip of the strata, when ores of lead or copper would very probably be found.

And finally, with the view of ascertaiuing the existence of auriferous, or argentiferous deposits, I would urge the complete exploration of the mountains, at elevations from 7,000 to 13,000 feet, passing over the merely primitive strata, and carefully examiniug every yard of the transition rocks, wherever found superimposed.

A notice of a remarkable Hot Wind *in the Zillah of Purneah.—Communicated* by H. Piddington, *Esq.*

I heard in the early part of last year (1847) that a very singular hot blast had suddenly destroyed a large extent of Indigo cultivation in a factory belonging jointly to Messrs. Macintyre and Co. of Calcutta, and Mr. R. Cruise, the managing partner; and on application to Messrs. Macintyre and Co. I was favoured with a sight of Mr. Cruise's letter, from which I made the following abridged extract, preserving carefully of course all that is essential to the subject, and excluding only mere matters of business.

(Abridged letter from R. Cruise, Esq. to Messrs. Macintyre & Co.)

Delowry Factory, *May* 28, 1847.

"What I am about to tell you will appear almost incredible. About 5 p. m. on the evening of the 25th there came a blast of wind from the west like the *Simoon of the desert*. It lasted only four or five minutes, but in that short time did immense mischief, it came right across the

heart of my finest and most forward cultivation, and the leaves of the indigo plant withered up before it just exactly as if they had been *fried in a frying pan* and the leaves are all fallen off. How far the plant itself is affected I cannot yet say. We have not had rain for some time, and without it I am afraid the loss will be very great indeed; under any circumstances the manufacturing will be thrown back at least twenty days.

I believe neighbouring factories have all suffered more or less, but the principal fury of the heat was confined to a narrow slip of land in which was all my finest indigo, extending east and west about eight miles. The plant on either side of the slip escaped with comparatively little injury, and on the opposite side of the Ganges did not suffer at all. The wind was probably cooled by the river.

To crown all, the buildings and out-houses of two factories are blown down and some of the masonry work necessary for the manufacturing process, such as the tables, &c. are broken and materially injured by the fall of the posts and roofs. In two factories there is not a house left standing.

The heat was so intense that in every village about here the villagers flew out of their houses from one end of the village to the other to look *for the fire.* In this factory also we all ran to an eminence to see where the fire was."

Your's very sincerely,

(Signed) R. Cruise.

Upon this letter I drew up the following queries, of which also one or two copies were sent to Mr. Cruise, who circulated them to his neighbours, but I fear has received no replies to them, as none have reached me.

1. *What was the state of the weather, winds, clouds, and average heat of Thermometer (at about noon) during the day of the hot wind (the 25th of May) and the height of Barometer with you or any neighbour?*

A. As well as I recollect, befor noon the day was clear, after noon cloudy and very hot; all day I did not consult the thermometer.

2. *What was the direction and force of the wind at the time of its occurrence? and did it change?*

A. From west to east. It did not change.

3. *What did the Thermometer rise to in the house or outside during the hot wind?*

A. I did not myself observe, but am told between 98° and 100° *in the house.*

4. *What was the appearance of the sky and clouds; was there any red or other coloured appearance about them?*

A. Very red and dark during the time that the hot blast lasted.

5. *Were delicate persons or animals affected while it lasted?*

A. Some villages complained that they could not have endured the heat for any length of time.

6. *You state eight miles about east and west as the length of the mischief, but what was the breadth of this strip on an average, and of its broadest and narrowest parts in yards, and what the exact direction?*

A. The hot blast was not confined to a narrow strip, but extended from north to south at least 15 miles; that is, from the banks of the Ganges inland. The injury done to the strip of indigo plant was undoubtedly owing to the inflammable nature of the colouring matter in the indigo plant, and to a chemical combination and decomposition.

7. *Was the wind the same way on the north and south sides of the track, or was it different, i. e. east on one side and west on the other, as with the common dust Whirlwinds? If differing, please to note as exactly as possible how it was on each side, and if any means exist, how it was in the middle. This may be determined by trifling things, such as branches of particular trees or shrubs carried forward or backward, &c.*

A. Same way.

8. *Did the blast lift things at all?*

A. It tore up a number of trees (some of them very large ones) by the roots and broke off bodily posts built into pucka work.

9. *Did it kill or hurt any animals, such as birds, snakes, &c.*

A. Don't know.

10. *How was the wind in the damaged factories, and was this done by the hot wind or a common storm or squall? Please to get the best description you can of the destruction and especially if it was occasioned by the hot blast, and if this was considered as a whirlwind or a strait-blowing stream like a north-wester.*

A. The damage done to the buildings was by the force of the wind. It did not appear to be a whirlwind, in fact by all accounts, it was not so, but a straight blowing stream.

11. *Was there any rain before, during or after the blast. The same of thunder and lightning?*

A. A very few drops of rain fell just before we felt the heat. No thunder or lightning

12. *What time may it have taken to travel from one extremity of the track to the other, i. e. at what rate per hour did it move on, by the best guess you can make?*

A. I have no idea as to the rate of velocity. The storm lasted about 20 minutes—the hot blast was during about eight or ten minutes at the latter end of the storm.

13. *Can you obtain any sort of statement as to how it begun? Did it descend from above or how?*

14. *Was it of full size at the beginning of the track?*

A. I have no idea. The first impression was that there was a fire, or that a large mass of the electric fluid must have fallen in the *neighbourhood*—but this was completely disproved by the extensive reach of the blast.

15. *Was the course wavy or a straight line, and did it appear to turn out of its way for any obstacles?*

A. The hot blast did not appear to me to travel perfectly straight; some indigo fields were completely destroyed, some very little injured.

16. *Was there any perceptible smell with it of any kind?*

A. I thought so, but no one else seems to have observed it. I thought there was a sulphureous smell.

17. *Is the ground torn up in any part of the track?*

No reply given to this.

18. *Was the soil wet or very dry, or moderately moist?*

A. Very dry.

19. *If it was the hot wind which did the mischief in the factories did it appear to affect metallic bodies and fastenings in any way?*

A. No.

20. *If any things were lifted, how far were they carried?*

No reply given.

21. *What is the position of your factory from the nearest station, and at what distance also from the Ganges?*

A. Three factories on the north bank and one on the south bank of the Ganges varying in distance from the river from a mile to 3 miles, and all lying S. E. of the station of Purnea, which is distant about 36 or 40 miles.

22. *Is the line at the edges of the path of the blast very distinct or gradual and what is an average distance in feet or yards between the nearest fully burnt plant and that which is uninjured, and what is the state of the intermediate plants?*

No reply given.

23. *If any good native accounts from villagers or Factory servants can be obtained, I shall be glad to have them in Bengálí or in English.*

A. Some of the carpenters in my employment have relations in the Morung engaged in the timber trade, who have lately returned home, and who say that fire fell from heaven in large masses, and that seven men were killed.

Mr. Cruise, in forwarding the replies to the queries, says :—

"In compliance with the request contained in yours of the 11th, I have had the pleasure of answering the questions proposed by you according to the best of my ability and recollection, and I herewith

return them. I am sorry I did not pay more particular attention to the phenomenon of the hot blast, which I noticed only as far as it was connected with my own business, and which otherwise I should not perhaps have observed. The other set of questions is in circulation among my friends in the neighbourhood, and I will return it in due time.

I would call your particular attention to the answer to the last question, viz. No 23 ;—I incline strongly to believe the report of the Morung carpenters, that fire fell from heaven. Their account is so exactly in accordance with scientific research that I cannot doubt the truth of it. They say that the seven men who were destroyed, became *like stones*, and that their friends could not take them up to perform the usual rites. They also say that the fire remained visible and hot for many hours after it fell in masses like large stones or blocks of coal."

And he inclines to believe that the bodies of the men may have been *vitrified!* as in the case of burnt stacks of straw and of Lot's wife! but he forgets that, to this the objection is, that in the stacks the alkali and silex to form the glass are present in the material of the stack in large quantities, while human bodies would afford but a small portion of alkali, and this again in a way not likely to form any petrous mass by fusion with the earth of the bones. The fact however, of the appearance of a hot blast of great extent and violence at a high temperature, with the peculiar inflamed appearance of the atmosphere said to accompany the simoon, is of great interest, whether connected or not with the meteor said to have occasioned the death of the seven men in the Morung, probably at a considerable distance from Delowry. I have read somewhere, but I cannot now refer to the passage, of hot blasts being in some seasons experienced in Bundlecund, which often occasion death to those who are exposed to them. They are said to occur only in the height of the hot season, and the writer, I think, tries to account for them by some theory of excessive reverberation of heat in rocky defiles.

I trust that in future, members and residents in the country, who may be able to assist us in tracing these remarkable meteors, will not fail to do so : there seems to be something more than remote glimpses of a connection between intense electric action, such as this probably was, and the effects of whirlwinds and waterspouts. H. P.

On the Fall of Rain at Patna.—By C. E. Ravenshaw, *Esq. C. S.*

I have the pleasure to enclose, for record in the Meteorological Department of the Society, an abstract of the quantity of rain which has fallen at Patna during the last 5½ years. It may prove useful to some future Meteorologist who may be desirous of inquiring into the general distribution of rain throughout the extent of India, and of comparing the quantities which fall in different localities. Both the climate and vegetable productions of a country must very much depend upon the quantity of rain which annually waters its surface, and such data as that now afforded cannot, therefore, be altogether uninteresting in an agricultural and horticultural point of view. The observations have been made by myself with an English pluviometer placed near the ground, and I have every reason to believe that the result is a near approximation to the truth. It will be observed that the average of 5 whole years, including the rainy and dry seasons, is 36.65. I regret that I shall be unable to bring the observations down to the end of the present dry season, as I am about to leave India. The late rainy season was a very heavy one (43.48) and when the results of the whole year shall be added to those of the preceding 5 years, it is probable that the average of the whole 6 years will be about* 38.18. The average of 13 years in Calcutta is given in one of the Almanacs at 58 inches, and the average of 5 or 6 years at Delhi was stated in the papers sometime ago at 24. The average of Patna is therefore something less than the mean† between the two extremes of the Bengal Presidency. As the monsoon commences in the Bay of Bengal and travels westward, following generally the course of the Ganges towards

* 43.48 Rainy Season of 1847-48.
2.35 Average of 4 dry seasons.

45 83
183 24 Total of 5 whole years.

6)229.07

38.18 average of 6 years.

† Calcutta, 58
Delhi,.... 24

2)82

41
Patna,.... 38

Difference, 3

Simlah, this is about the proportion which it might be expected beforehand would fall to the lot of Patna and Delhi respectively. At Bombay the average of 25 years has been stated at 76, which is greatly in excess of that of Calcutta. This may be owing to the chain of mountains to the east of Bombay, which probably arrests a great portion of the clouds which would otherwise distribute themselves over the Dekhun. The average fall of rain in England is stated in an Encyclopœdia at 31, and that of the whole world at 34, so that Patna has no reason to complain of being stinted of its fair proportion of the fertilizing gift of Heaven.

Abstract of Rain at Patna for 5½ years.—(Lat. 25° 36′.)

		1842-3	1843-4	1844-5	1845-6	1846-7	1847-8	Average.
Rainy Season.	May, ...	..	1.54	3.40	2.24	.. 84	1.66	
	June, ...	7.33	5.50	4.95	4.74	65 6	2.36	
	July, ...	14.06	3.05	9.00	9.34	104 2	13.10	
	August, ...	11.86	3.76	10.78	7.20	90 0	16 99	
	September, ...	10.11	3.38	4.26	7.69	9 12	5.37	
	October, ...	6.46	4.03	.. ..	.. ..	.. 8 5	4.00	
	Total,	49.82	21.26	32.39	31.21	36.79	43.48	35.82⅕
Dry Season.	November, ...	0.00	——	——	——	——	1.39	
	December, ...	1.74	——	——	.. 60	——		
	January, ...	.. 11	.. 46	.. 67	.. 14	1 90		
	February,.....	.. 23	1.53	.. 75	.. 75	...07		
	March,.....	.. 10	.. 07	——	.. 60	.. 05		
	April, ...	.. 12	1.19	.. 05	——	.. 64		
	Total,	2.30	3.25	1.47	2.09	2.66		2.35
	GrandTotal of year..	52.12	24.51	33.86	3330	39.4		36.65

On the great Diamond in the possession of the Nizam.—By Henry Piddington, *Curator Museum Economic Geology.*

At the November meeting of the Asiatic Society Captain Fitzgerald, B. A. presented for the inspection of the Society a model in lead of this remarkable stone, and gave a brief note of its history, which will be found in my report for that month. He has since favoured me with a more detailed one, which is as follows.

Note by Captain Fitzgerald, Bengal Artillery, attached to the Nizam's Service, on the Nizam's Diamond—1st December. 1847.

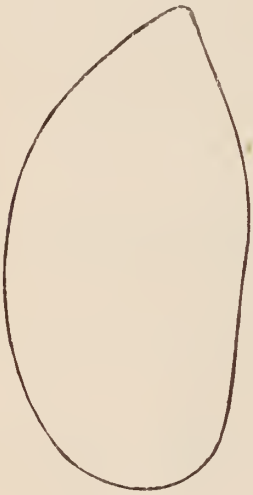
"About 12 or 14 years ago a large diamond was found in the Nizam's country under circumstances of rather a curious nature. The model

now shown is the model of a part only, a piece having been chipped off, which after passing through many hands, was purchased by a native Banker for 70,000 rupees.

"The larger piece, as represented by the model, is in the possession of his highness the Nizam, and at the time of discovery was exhibited to many European gentlemen.

"The manner in which this Diamond was originally found, may be considered interesting. It was first seen in the hands of a native child, who was playing with it, of course ignorant of its value. On *eight* annas being offered for what the poor people considered as a mere stone, their suspicion was excited, which led ultimately to the discovery of the bright stone being a real diamond.

"Its form and size is shown below. This stone, hitherto unknown, may now be classed among the larger description of Diamonds which we read of, but seldom see."



Base.

Side view.

The size of the stone exactly taken by callipers, from the leaden model, is as follows :—

Length, ...	2.48. *Inches.*
Greatest breadth, ...	1.35.
Average thickness, ...	0.92.

I have had now exact models cast in glass from the leaden one exhibited at the meeting, and I find that

	Grains.
Their absolute weight is, ...	1164.50.
Their Specific Gravity, ...	3.70.

Now according to various authorities we have for the specific gravity of the Diamond

Ure, ...	3.53.
Brewster, colourless, ...	3.52.
orange, ...	3 55.
Jameson twelve authorities, mean, ...	3.52.
Mean, ...	3.52.

And hence assuming our model to be exact, (and it is very nearly so,) we have by a simple proportion not quite 1108 grains for the actual weight of the Nizam's diamond.

This is equal to 277 Carats of weight of the rough diamond, and as the rough stones are usually taken to give but one half of their weight when cut and polished, it would allow 138½ Carats, or a weight between the Pitt (or Regent) diamond (136¾ Carats), and that of the Grand Duke of Tuscany (139 Carats), for it in its present condition ; and if we take it that one-eighth of what it would be when polished was taken off with the splinter sold to the native, as related by Captain Fitzgerald, we shall then have 155¾ Carats for the possible weight of it, if it had been cut and polished entire; which would then place it as to weight between the Tuscan and the great Russian Diamond of 195 Carats, which last is well known to be an Indian stone.

We are not informed if this stone is considered as likely to be one of pure water, which can only be ascertained by polishing it, though we know that the natives of India, and particularly of the Deccan, are too good judges of diamonds to mistake a topaz for one, and it is stated that 70,000 Rs. have been paid for the fragment. It therefore certainly adds one extraordinary fact more to the history of this most wonderful of the gems."

Miscellaneous.

Extract of a letter from Capt. J. D. Cunninghah, *Political Agent, Bhopál.*

1.—*Lingam at Bhojpur.*

"I took a run round the other day to Bhojpúr, to look at the Lingam there again; for after answering a note of yours in the affirmative about the contemporaneousness (a long word) of the "Achintea deoj," I had some misgivings, and I am now satisfied that it is *not* original. This circumstance does uot of course affect my argument, for whenever written, it was written by a Hindoo, aud that is sufficient; that it is there, is indeed enough.

The letters are not so evenly cut as they would doubtless have been by the original architect; neither are they quite in the centre of the stone; and although we have the example of Roman inscriptions, even on coins, being straggling, I give this one up as contemporary.

If my former note misled any one besides yourself, pray give the necessary explanation."

2.—*Inscription at Singapore.*

In the sixth volume of the Journal, page 680, there is an interesting account of an ancient and much weatherworn inscriptiou on a rock at the jetty of Singapore. A facsimile was prepared by Dr. Bland of H. M. S. *Wolf* and forwarded by him to James Prinsep, who pronounced the character to be Pali, and though unable to connect senteuces or even words, easily recognised many of the letters, and conjectured the inscription to record the extension of Buddhism to the Malayan promontory. On learning from Dr. Montgomerie that this rock had been blasted some years ago, I ventured to solicit the present Governor, the Hon. Col. Butterworth, C. B. to secure any legible fragments that might yet exist; and have since received his kind promise to forward such to the museum of the Society, where I trust the practised eyes of our antiquarians may yet decypher enough of the legend to determine its purport. Col. B. observes:—"The only remaining portion of the stone you mention, except what Col. Low may have, I found lying in the verandah of the Treasury at Singapore, where it was used as a seat by the Sepoys of the guard and persons in waiting to transact business.

I lost no time in sending it to my house, but, alas! not before the inscription was nearly erased. Such as the fragment was then however, i. e. in 1843, it is now; for I have preserved the stone with much care, and shall have much pleasure in sending it for your museum, having failed in establishing one, as I hoped to have done, in Singapore. I am happy in thus far meeting your wishes, and in assuring you that I shall always be ready to forward the views of the Asiatic Society."

3.—*Extract of a letter from Professor Henry, to Dr.* O'Shaughnessy.

"I have for some time past been able to do but little in the way of science, my time, during the present year, has been completely absorbed in the organization of an Institution lately established in Washington, by the munificent request of the late James Smithson, of England.

Smithson was the illegitimate son of the Duke of Northumberland, and in his day was considered a chemist of some merit. He was a frequent contributor to the transactions of the Royal Society and to the pages of the Philosophical Magazine. He died at Genoa in 1829, leaving all his property, in case of the death of his nephew, to the United States, to found at Washington (such are his words) an establishment under the name of the Smithsonian Institution for the *Increase* and *Diffusion* of knowledge among men. The money (500,000 dollars) came into the Treasury of the United States about 8 years ago, but Congress could not agree on any proposition for the organization of the Institution until last year, when an act was passed giving some general directions and placing the Institution under the care of a Board of Regents. This Board chose me the Secretary, or active executive officer, of the Institution; and they adopted, provisionally, the plan of organization of which you will find a programme in the package I send you.

I suppose you receive all the Journals and keep yourself posted up, in a knowledge of all the discoveries of science. One of the most wonderful additions to medicine is the effect of the inhalation of ether. I send you a pamphlet on the history of this discovery, made by an acquaintance of mine, Dr. Jackson of Boston. Some of the effects would appear to be similar to those of your extract of hemp.

Astronomy appears to be in the ascendant. I have just this minute received a note from Philadelphia, informing me that the second new asteroid, discovered by Hencke, has been seen in that city. The discovery of Le Verrier and Adams is a remarkable fact in the history of science, and the wonder, with reference to it, has been increased by the researches of Walker and Pierce, two American savants, who have proved that the planet Neptune is not the only body that occasions the perturbations of Uranus, but that there must be another, if not more planets, to produce the observed effects; or in other words, they have proved that Neptune is not the hypothetical planet of Le Verrier and Adams, rendered visible by the glass of the German observer, but another body, the discovery of which was in a great degree accidental.

Have you looked at the researches of Mattencci on endosmon and on the electrical currents of the animal body? They are highly interesting.

Mattenci has shown that during life there is constantly a current from the muscle to the blood, and thence to the fasica; or in other words that the muscle is the zinc, the blood the acid, and the fascia the copper.

The electrical telegraph is in rapid progress of extension over our country, and will soon unite the most distant extremities of the *Union*.

On a late occasion the marking apparatus was worked through a distance of 900 miles of wire. This was effected, however, by means of a local battery, to operate the marking machine, and the circuit of which was closed by the slight motion of a small tongue of soft iron between the legs of a horse-shoe galvanic magnet, around which a part of the wire of the long circuit was coiled. Considerable difficulty has been experienced in the long reaches during wet weather in preserving the insulation; the electricity escapes along the posts. I have suggested the propriety of distributing the batteries in parts along the whole length of the circuit in order to obviate this difficulty. A single battery is now placed at one end of the line, and consequently, the electricity must rise to considerable intensity to pass the whole distance. The resistance to the return current through the earth appears to be inappreciable; the great amount of conducting matter reduces the resistances of the earth and moisture to an infinitesimal quantity, though under other circumstances they are found to be considerable. This is shown by the following experiment of my own. The long wire of the telegraph was broken at a convenient point, and the two ends of the

break, plunged, at the distance apart of about an inch, into a tumbler of water; though the electricity would readily pass through hundreds of miles of moist earth, not the least quantity appeared to be transmitted by the inch of water in this arrangement. The explanation does not appear to be difficult. In this case the quantity of conducting matter was not sufficient to allow of the lateral expansion of the electrical currents necessary to the diminution of the resistance of the water.

Another obstacle to the operation of the telegraph in this country is the indicative influence of every flash of lightning which takes place within many miles of the line of conductors. You have probably seen my report on this subject, made to the American Philosophical Society and republished in the Philosophical Magazane last winter. I regret that I have not been able as yet to find a copy to send you.*

You have perhaps seen an account of my researches on the spots of the sun by means of the thermo-electrical apparatus, and an image of the luminary in a dark chamber. I have since applied the thermo-pile to the eye-end of a large reflecting telescope, and the combination has given me an instrument of such delicacy that I can detect the heat of a man's face at the distance of several hundred yards. The smallest cloud will give a deflection of the needle of 30 degrees. I have intended to apply this arrangement to the exploration of the heavens for differences of temperature in the celestial vault; and a few observations I have made give some interesting results, but my engagements have been such that I have been unable to follow them up.

I think I informed you in a former communication that I had worked out fully, the cause of the phenomena of the lateral discharge; but I am ashamed to say that my paper in full on this subject has not yet been published. I have from time to time given the facts to the American Philosophical Society and they have appeared in the different numbers of the proceedings of this body. You will find some of my results mentioned in my report on the wires of the telegraph, a copy of which I have been so fortunate as to find, and which you will receive in the package I send you.

I have to regret that the articles I send you are not more worthy your acceptance; they are such as were on my table at the time I re-

* I have since found a copy, which I enclose in the package.

ceived the intelligence that my friend is to start to-morrow; you will please to accept the package, and this rambling letter, with the assurance that I shall ever recollect with pleasure your short visit to Princton and shall cherish the hope of again meeting with you before the termination of the journey of life."

4.—*Library, &c. at Jessulmere.*

Extract of a letter from A. Sutherland, *Esq. to* H. M. Elliot, *Esq.*

"My visit to Jessulmere has been of a very satisfactory kind, as you will see presently. I wish that you or any one learned in Hindu or Buddhist antiquarian lore, were there. You know, I dare say, that the most valuable collection of books in India is believed to be in a Jain temple on the hill fort. The temple has never been desecrated, for the fort was never taken I believe, and the Buddhist form of worship is now the same as it was perhaps a thousand years since; women principally ministering. There are a number of tablets, some of them in niches in the walls, others separate, covered with inscriptions in unknown characters; not the arrow-headed, I think. I was disappointed in the extent of the library, which is in a vault of the temple; the few books we saw, the others being in chests, were, some of them, writings on palm leaves, bound up between boards, such as we see in Ava and China; the characters *readable* by the pundits; but the language unknown; the only dates readable on the tablets were only 300 or 400 years old, but most of them are of great antiquity. Some of the tablets are of a mystical character evidently, and of curious shield shapes. Tod drew much of the material for his history from the Jessulmere library, although he never was there I believe."

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR FEBRUARY, 1848.

THE usual monthly meeting was held on the evening of Wednesday, the 2d February, 1848.

J. W. COLVILE, Esq., President, in the chair.

The proceedings of the evening commenced by the Secretary's reading the following note from Mr. Colvile, acknowledging his election as President of the Asiatic Society.

To the Secretary of the Asiatic Society.

SIR,—I beg leave to acknowledge your letter of this day, in which you inform me that the Asiatic Society of Bengal have done me the high honor of electing me the President of the Society for the year 1848.

The assistance which I am sure I shall receive from you and the other officers of the Society will, I trust, enable me so to discharge the duties of the office that the Society may not have reason to repent of its choice.

I have the honor to be, Sir,

Your Obedient Servant,

Jan. 13th, 1848. JAMES W. COLVILE.

The Council communicated the following letter from the President, announcing Lord Dalhousie's gracious acceptance of the office of "*Patron*" of the Society.

To the Secretary of the Asiatic Society.

MY DEAR SIR,—I have to inform you that this morning Mr. Bushby and I waited upon the Governor General by appointment, and that His Lordship was pleased to express his willingness to become Patron of the Asiatic Society of Bengal, and his readiness to further the interests of the Society by all means in his power.

I regret to state that Sir John Grant and Lord Arthur Hay were both prevented from accompanying Mr. Bushby and myself, the former by indisposition,

the latter by his departure for Madras, which took place on the day preceding that fixed by the Governor General for the reception of the deputation.

I take this opportunity of recording my opinion that the Council was guilty of an unfortunate oversight in the omission from the list of those who were to form the deputation, of the names of yourself and Mr. Laidlay. I think that on all similar occasions the gentlemen who fill the office of Secretary should be understood to be necessarily and as of course, included amongst the representatives of the Society, and this, both in justice to themselves, and because they are probably the persons best qualified to give such explanation as may be required of the constitution, objects, and working of the Society.

Very faithfully Your's,

Jan. 18*th*, 1848. J. W. Colvile.

The accounts and vouchers for January were submitted.

H. Alexander, Esq., C. S., duly proposed and seconded at the January meeting, was ballotted for and elected a member of the Society.

Read a note from *Mr. W. Knighton*, withdrawing his name from the list of members.

To the Secretaries of the Asiatic Society of Bengal.

Gentlemen,—Finding that I have at present no time to devote to literary pursuits unconnected with my duties, and not being likely to have any such for many months to come, I shall feel obliged by your removing my name from the list of members of the Bengal Asiatic Society from the commencement of the current year.

I am, Gentlemen,
Your Obedient Servant,

Calcutta, Jan. 11*th*, 1848. W. Knighton.

From H. M. Elliot, Esq., Secretary to Government, Foreign Department, transmitting a Journal and Map by Capt. A. Cunningham, illustrative of the boundary between the British territories and those of the Maharajah Golab Singh.

From H. M. Elliot, Esq., Secretary to Government, Foreign Department, presenting the MS. of a grammar of the Sindhi language, by Lieut. Stack. (Referred to Oriental Section.)

From Capt. Kittoe through Mr. Bushby, forwarding for inspection of the Society, Lieut. Maisey's copies of the Kalinger inscriptions, and drawings of the architectural antiquities of Kalinger and Nilkant, with MS. description by Lieut. Maisey, and transcripts in modern Nagree, by Capt. Kittoe—also returning the drawings, plates, &c., of the Cave

Temples of Mandah, which at Capt. Kittoe's own request had been lent him, for examination and for description in the Journal; having taken them with him to Benares, in July last, Capt. Kittoe, in reply to applications from the Secretaries, returns the drawings (date of receipt Jan. 27th,) and expresses his inability to spare time to copy and describe them.

Read the following letter from J. Thornton, Esq., Secretary to Government, N. W. Provinces, also referring to the Kalinger and Mandah drawings.

No. 107 of 1848.

From J. Thornton, *Esq. Secretary to Government, North Western Provinces.*

To the Secretary to the Asiatic Society.

Dated Head Quarters, Jan. 26th, 1848.

Sir,—With reference to my letters to your predecessor dated May 19th, and December 19th, 1846, regarding drawings of the Kallinger and Mandah Cave Temples, I am directed by the Hon'ble the Lieut.-Governor of the N. W. P. to request that the drawings and papers transmitted with those letters may be made over to Mr. G. A. Bushby, the Secretary to the Government of India in the Home Department, if they are no longer required by the Society, in order that they may be transmitted to the Hon'ble the Court of Directors.

2d. I am further desired to inform you that a second series of drawings of the Kallinger Temples, executed in a very superior style by Lieutenant Maisey, 67th N. I., together with an explanatory memoir, and fac-similes of inscriptions, have been despatched to Mr. Bushby for transmission to the Hon'ble Court of Directors. If the Society are desirous to inspect these papers and feel disposed to take copies and to publish any of them, no difficulty will be experienced in accomplishing this object, upon application being made to Mr. Bushby.

I have the honor to be, Sir,

Your Obedient Humble Servant,

J. Thornton.

Secy. to Govt. N. W. P.

With reference to the above correspondence, and to a statement read to the meeting that the Hon'ble the Governor of the N. W. Provinces considered that the former communication regarding the Mandah temples, had been neglected by the Society, it was unanimously resolved—

1—That the description of the Kalinger antiquities be published forthwith, and the drawings copied for the earliest possible publication.

2—That the cause of the delay in publishing the drawings of the Mandah Cave Temples, be explained to the Hon'ble the Governor of the N. W. Provinces.

Also received through Capt. Kittoe, 32 silver coins of Buddhist type, presented by Mr. Money—one set for the Society,—one for the Hon'ble Court—found on the site of an ancient town on the Soane.

From A. Shakespeare, Esq., Acting Secretary to Government N. W. Provinces, dated Jan. 6th, 1848, transmitting a copy of each of the Arabic works, entitled Tareekh Yaminee and Kaleela wa Dumna.

From Mr. G. A. Bushby, presenting two ancient Greek coins purchased by Mr. Bushby at the Acropolis of Athens; and an ornament from a mummy exhumed by Mr. Bushby at Thebes.

From D. Cunliffe, Esq., Magistrate of Monghyr, forwarding for the examination of the Society 8 gold coins found at a village in the Pergunnah Hevelee, Behar.

The 8 coins, which are of the Indo-Scythic group, were exhibited to the meeting, and referred to Mr. Laidlay and Major Anderson for Report.

From Dr. A. Campbell, Darjeeling, presenting a copy of the French edition of Bernier's Travels, 2 vols. 12mo. with Plates.

From H. Piddington, Esq., forwarding a notice of a remarkable hot wind in the district of Purnea. (Ordered for publication.)

From Dr. Irvine, Darjeeling, forwarding a paper entitled, "Observations on the probable results of a scientific research after the Metalliferous deposits in the sub-Himalayan range round Darjeeling. (Ordered for publication.)

From Mr. Blyth, forwarding extracts of letters from Signor Apparuti of Modena, and Mons. Malherbe of Metz, proposing exchanges of objects of natural history, with the Museum of the Asiatic Society. (Referred to the Section of Natural History.)

From the Rev. Mr. Street, of Bishop's College, presenting copies of a pamphlet, by the Rev. Mr. Driberg, entitled, "A Missionary Tour among the Gonds south of the Nerbudda, with a specimen of their dialect and grammar." (Ordered that the specimen be printed in the Journal.)

From J. Muir, Esq., regarding the Oriental works which he considers should be published by the Society: also suggesting renewed

efforts to procure a copy of the Pseudo-Yajur Veda composed by the Roman Catholic Missionaries, to facilitate the reception of Christian doctrines in India.

To the Secretaries of the Asiatic Society of Bengal.

Gentlemen,—With reference to the contents of pp. 1268—69 of the No. of the Society's Journal for December last, relative to the parts of the Vedas which should be published by the Society, I would take the liberty of offering the following suggestions for the consideration of the Oriental Section.

First.—It appears from Professor Wilson's letter of 17th September last, that only three out of the four Vedas are about to be printed in Europe. The fourth, or Atharva Veda, has not been taken in hand. Might not our Society undertake its publication? An account of the contents of this Veda may be found in the first of Dr. Roth's treatises on the History and Literature of the Vedas, translated in the Journal for August last, to which I have not at this moment the means of referring more particularly.

Second.—I think it appears from the same work that Dr. Roth was publishing an edition of the Nirukta, and that another scholar was bringing out in Germany the Aitareya Bráhmana. It would therefore appear adviseable that the publication here of these and any other parts or appendages of the Vedas which are reported to be likely to be printed in Europe, should be allowed to lie over, at least till other portions, for the printing of which no provision has been made in Europe, shall have been brought out. If indeed any of these Upanishads are of no great length (a point on which I am not informed) a reprint here of one or more which have already been printed in Europe would be of no great consequence, and would certainly render our edition complete.

I observe in Messrs. Smith, Elder & Co.'s Literary Circular from July to November 1847, a new work on the Vedas advertised, with the following title, which I beg to suggest may be added to the Society's Library:

"Essai sur le mythe des Ribhaus, premier vestige de l'apotheose dans le Véda, avec le texte Sanskrit par F. Neve." 8vo. sewed, price 11. Paris.

I suggested to the Society several years ago that an attempt should be made to procure for the Library the original Sanskrit text of that curious work the Pseudo-Yajur-Veda, (of which some account is given in a paper by Mr. Ellis in one of the earlier Vols. of the Society's Researches, as well as in the English preface to Dr. Mill's Sanskrit poem, the Christa Sangítâ) which the Roman Catholic missionaries composed several centuries ago to promote the reception of Christian doctrines. A French translation of this Pseudo-Veda or part of it, appeared at Yverdun towards the close of last century, which is perhaps in the Society's Library; but it appears very desirable that we should possess the original of so curious a work. In consequence of my former suggestion, Dr.

Wilson of Bombay was requested to use his endeavours to procure a copy; but I do not recollect to have heard the result. If no effective steps were taken towards the end in view, I would beg to suggest that the attempt should be renewed, and application made to any of the Society's Correspondents in the Madras Presidency, or in any quarter which may seem most likely to promise success. It was in the College of the Jesuits at Pondicherry, if I recollect right, that the manuscript was said to be deposited; and perhaps that establishment may have been broken up at the period of the French Revolution or from subsequent causes. If this, on enquiry, appear to be the case, the fate of the Library, and its present place of deposit, if still in existence, might be traced.

I have the honor to be, Gentlemen,

Your most Obedient Servant,

Calcutta, Jan. 20th, 1848. J. Muir, M. A. S. B.

Resolved, that M. E. Ghibelin of Pondicherry be requested by the Society to institute the search for the Pseudo-Yajur Veda, recommended by Mr. Muir.

Read a proposition from the Council, that Dr. Joseph Dalton Hooker, R. N. F. R. S. &c., &c. author of the Flora Antartica, late Naturalist to Sir John Ross' expedition, and who has accompanied the Earl of Dalhousie to India for the purpose of examining the Flora and natural productions of the Sikim district, and eventually of Borneo—be elected an Honorary Member of the Asiatic Society. Dr. Hooker was accordingly elected by acclamation an Honorary Member of the Society.

Mr. H. M. Elliot, presented and read extracts from several reports from Capt. A. Cunningham, on the progress and investigations of the Tibet Mission. The Secretaries having undertaken to print the whole of the documents in the February number of the Journal, it was proposed by the Lord Bishop, seconded by Dr. O'Shaughnessy, and voted by acclamation, that the cordial thanks of the Society be presented to Mr. Elliot for the valuable aid he is affording to the Society's labours.

Dr. O'Shaughnessy read several extracts from a private letter to himself, from Professor Henry, of Princeton, United States, containing an account of the origin of the Smithsonian Institute, and remarks on several most important discoveries in physical science. The Secretaries were requested to publish the extracts read, and on the proposition of

Dr. O'Shaughnessy, Professor Henry was named for election as an Honorary Member of the Society.

The Report for 1847 having been brought up for final consideration, and a paragraph regarding the Subscriptions to the Society having been modified on Dr. Walker's suggestion, Dr. Walker's name was added to the Committee appointed to examine a proposal for the erection of a new Museum. Dr. Walker, with reference to the rules of the Society, read the following proposals :—

1. "That no alteration in the Rules, nor any extraordinary expense beyond (say) 500 Rupees, be sanctioned, except at the annual meeting of the Society ; and that before any such questions are finally decided, the Mofussil Members, as well as those residing in Calcutta, be called upon to vote on the same."

"Before this proposition be carried into effect, it is desirable that the Rules of the Society should be made as perfect and complete as possible and that during the interval between each annual meeting, the functions of the Society be solely administrative, it is therefore proposed"—

"2nd—That the Council of the Society be appointed to revise the Rules, and that these be carefully compared with the rules of similar Institutions in Europe, and that copies of the latter, if they are not already in the Library, be immediately sent for overland." H. W.

After a short discussion, Dr. Walker's proposition, supported by Dr. O'Shaughnessy, was referred for consideration to the Council, who were requested to act upon the 2d para. thereof, at their earliest convenience.

The Report, with its several propositions, was then unanimously adopted.

Library.

The following books have been received since the last meeting :—

Presented.

Notulæ ad Plantas Asiaticas, Part I. Developement of Organs in Phanerogamous Plants. By the late W. Griffith, Esq. Edited by J. M'Clelland, Esq. (2 copies).—Presented by the Government of Bengal.

Icones Plantarum Asiaticarum, Part I. Development of Organs in Phanerogamous Plants. By the late W. Griffith, Esq. Edited by J. M'Clelland, Esq. (2 copies).—By the same.

Journals of Travels in Assam, Burma, Bootan, Affghanistan and neighbouring countries. By the late W. Griffith, Esq. Edited by J. M'Clelland, Esq. —By the same.

Transactions of the Royal Society of Edinburgh, Vol. XVI. part III. and Vol. XVII. part II.—By the Society.

Histoire de la Literature Hindoui et Hindoustani, Par M. Garcin de Tassy. Tome II.—By the Oriental Translation Fund.

Report of the Sixteenth Meeting of the British Association for the advancement of Science, held at Southampton in September, 1846.—By the British Association.

Record of Cases treated in the Mesmeric Hospital from June to December, 1847, (2 copies).—By the Government of Bengal.

Journal of the American Oriental Society, Vol. I. No. III.—By the Society.

Sketch of the Singphos, or the Kakhyens of Burmah: the position of this tribe as regards Banmoo, and the inland trade of the valley of the Irrawaddy with Yunan, and their connection with the North-Eastern Frontier of Assam.—By the Government of Bengal.

Glossarium Sanscritum in quo omnes radices et vocabula usitatissima explicantur et cum vocabulis Græcis, Latinis, Germanicis, Lithuanicis, Slavicis, Celticis, comparantur, a Francisco Bopp, (p. 289 to p. 412).—By the Author.

The Journal of the Indian Archipelago and Eastern Asia, Nos V. and VI. —By the Editor.

The Calcutta Christian Observer, for February, 1848.—By the Editors.

The Oriental Baptist, No. 14.—By the Editor.

Proceedings of the 24th Anniversary Meeting of the Royal Asiatic Society.—By the Society.

Proceedings of the Royal Society, No. 67.—By the Society.

Proceedings of the Royal Society of Edinburgh, Nos. 29, 30.—By the Society.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of December, 1847.—By the Officiating Deputy Surveyor General.

Nityadharmánuranjiká, Nos. 32 to 41.—By the Editor.

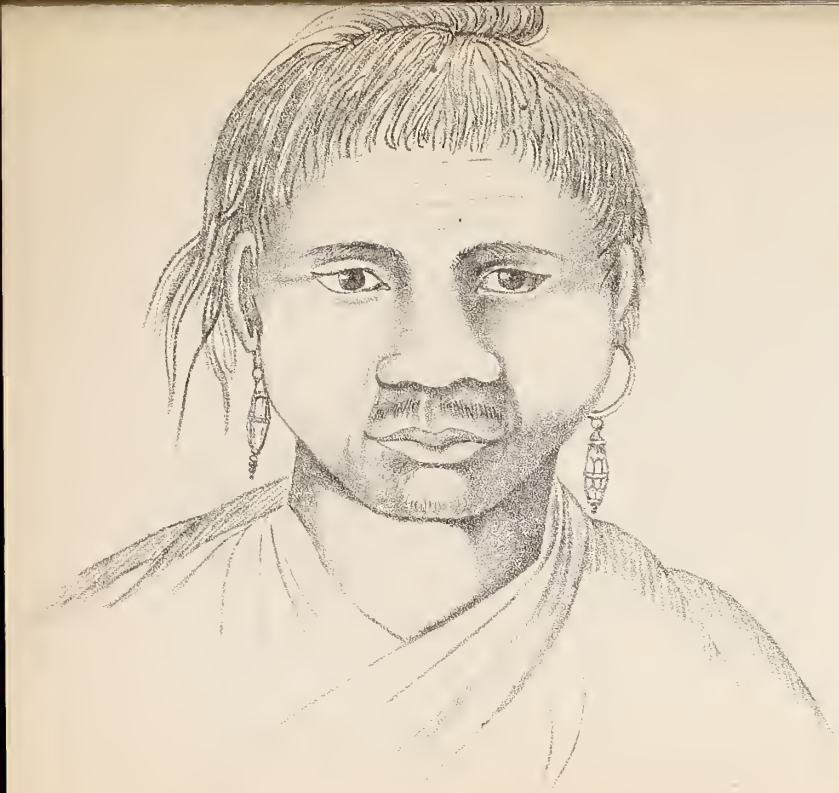
Tatwabodhini Patriká, No. 54.—By the Tatwabodhini Sobha.

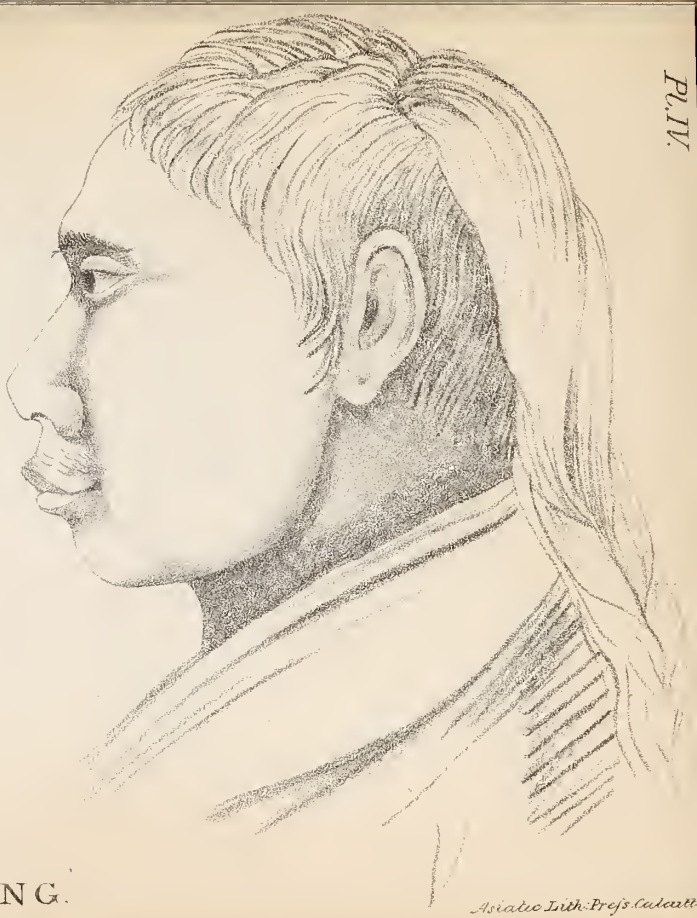
Vocabulary and Phrases, in English, Mini and Abor. By Capt. E. F. Smith.— By the Author.

Kalila-wa Dumnah, in Arabic, translated from the Pehlavy by Ibn al Makaffa. —By the Government of the North Western Provinces.

Otby's Tarikh Yaminy, or the History of Sultan Mahmud of Ghuzneh, by a Cotemporary, edited in the original Arabic by Moulavy Mamluk-al Alyy, Head Moulavy, and A. Sprenger, Principal of the Delhi College.—By the same.

Madras Journal of Literature and Science, No. 32.—By the Literary Society of Madras.





PHUCHUNG.
Aged 23 Years.

Asiatic Lith: Press Calcutta

EXCHANGED.

The London, Edinburgh and Dublin Philosophical Magazine, No. 209.

PURCHASED.

Journal des Savants, September, 1847.

The History of India, by the Hon'ble Mountstuart Elphinstone, 2 vols. 8vo.

Report of the Curator of the Museum of Economic Geology for the month of December 1847, *and January* 1848.

Economic Geology—Major Jenkins has forwarded to us some very beautiful specimens of Coal from Assam, from the last vein opened at Jaipur, the mines of which (for there are two of them) are situated on the opposite banks of the old Booree Dehing river. He accompanies it with the following extracts from Major Hannay's letters to him.

Extracts from letters from Major Hannay.

" In a previous letter he had stated that the native contractor who is now digging the coal had allowed the superincumbent stratum of clay and earth to fall over—he says, 21*st* October.

'I have at last cleared out the coal again, and if there were only boats, coal sufficient to last all the cold season could be sent off immediately.'

The ravine beyond the present coal, which rests on clay slate shows coal also, but apparently being superincumbent to the main mine; the coal is in small quantity, the uppermost vein however has a layer of capital Iron Ore lying on it. Taking it to be, as I suppose, this bed of coal with its different strata of sandstone, clay slate, clunch clay, shell, &c. is about 200 yards in breadth, and there is at least 14 feet of coal intermixed with clunch and soft partings in the present vein, but from being overtopped by a good high knoll there is much trouble in working it."

23*d*—" I am happy to be able to give you very favorable accounts of the coal mine, and I expect now, under proper management in working it out during this cold season, Government will be supplied with as much as they require of the finest article of the kind in India, but boats are the drawback; let any number be ready and coal is forthcoming for them. The plan is, in my opinion, for Government to work the coal for some time to come, as it is of too valuable a kind to waste in the way the natives do, and care should be taken that the mine does not fill up again during the rains. The steamers should be supplied from the inland mines, where a great portion of the coal is equally fit for their purposes, but the Dehing vein should be reserved for mint purposes, it is so valuable and should be taken care of; fancy 16 feet of coal, 10 of which is solid pure coal.

The bottom of the bed is bituminous clay slate, upon which rests a seam of highly carbonized coal, 4½ feet thick* and, including a little soft partings, in all 6 feet of solid coal; it is the most beautiful thing I ever saw, as the coal is so pure it shines as if chrystalized; this is all cannel coal and highly valuable for the mint or forge purposes."

The larger specimens arrived but a few days ago by the steamer, but as Major Jenkins has sent us some specimens by dawk I have examined the largest of them, and the result is as follows.

Coal from the banks of the Booree Dehing in Assam, sent by Major Jenkins.

This coal is a very handsome cannel coal, of specific gravity 1.31 burning with a good flame; not swelling or melting like the common bituminous coal, except in one or two spots, but preserving, whether burnt in the air or coked, all the sharp angles of its fractures for a long time.

It contains in 100 parts as follows :—

Water and gases,	5.50
Bituminous matter,	28.00
Carbon,	56.50
Ash,	10.00
	100.00

A separate experiment gave for the per centage of coke 57.14, but the fragment was taken probably from a different block or vein.

Major Jenkins has also sent a good collection of the clay iron ores from the coal beds of Upper Assam. They are massive and nodular hydrates of the oxide of iron, in the usual laminar concretions, which these ores affect. These are accompanied also by a good supply of the magnetic iron sand from the Sookee Dooars under the Cossyah hills in Kamroop.

Captain Fitzgerald, of the Nizam's service has favoured us with a more detailed memorandum relative to the Nizam's great diamond, of which the model was exhibited at the November meeting, and I have had some glass models cast from the leaden one, from which I have calculated the gross weight and that which the stone would have when polished. The results of this I have embodied in a note as a short paper for the Journal, which will thus place upon record this remarkable addition to our knowledge of these extraordinary gems.

No. 72 of our Indian copper ores, which was one sent from the Khetree hills near Jyepoor, by Major Thoresby (Journal Vol. X. p. 168,) and found by me amongst some old specimens and rubbish, I had put by for examination, as it had the appearance of containing Cobalt or Nickel, and upon examination, I find it does contain Cobalt. Our specimen is too small to admit of a quantitative analysis, but the locality is perhaps new.

* The specimens accompanying are from this 4½ft. vein.

From J. Homfray, Esq. we have received 6 copies of his "further observations on the coal fields of the Damoodah and Adji," in continuation (and a most valuable one) of that published in the Journal for 1842, p. 739.

From H. Michell, Esq. we have two splendid specimens, the one of the rich argentiferous Galena of Australia, containing he says about 200 oz of silver pr. ton of lead, and the other a rich ore of grey copper said to contain 50 per cent. of metal.

Geological and Mineralogical.—We have received from the Revenue Survey Office eight copies of Captain Sherwill's geological maps of zillahs Shahabad and Behar, which have been lithographed and coloured there from the originals in our possession.

Major Jenkins has also forwarded to Government the specimens collected on the Naga Agami Hills by Mr. Masters, whose report will appear in a forthcoming number of the Journal.

We have received through the Rev. Mr. Pratt, a paper of observations on the probable result "of a Scientific research after metalliferous deposits in the sub-Himalayan range round Darjeeling," with a collection of small specimens of the rocks and minerals of that neighbourhood, by Dr. R. H. Irvine, Civil Surgeon of Patna.

From Mr. A. Mitchell, of Gussery sugar-works, we have a fine Saurian tooth from Inverkeithing, a shell from the Sylhet limestone, and a cast or fossil from the old red sandstone of Forfar.

Printed copies of Mr. Blyth's Catalogue of the collection of Australian Vertebrata exhibited at the October meeting, were laid on the table.

With reference to the rule of the Society passed at the February meeting, 1848, and embodied in the Annual Report, we certify the above minutes of proceedings to be correct.

J. W. Colvile, *President.*
W. B. O'Shaugnessy, *Hon. Sec.* } *Of the evening.*

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of Feb. 1848.

Days of the Month.	Maximum Pressure observed at 9h 50m.						Minimum Pressure observed at 4 p. m.						Maximum Temperature.	Rain Gauges. Elevation.		Moon's phases.
	Barometer reduced to 32° Fahrenheit.	Temperature. Of the Mercury.	Of the Air.	Of Wet Bulb.	Wind. Direction from sunrise to 9h 50m.	Aspect of the Sky.	Barometer reduced to 32° Fahrenheit.	Temperature. Of the Mercury.	Of the Air.	Of Wet Bulb.	Wind. Direction from 9,50 a. m. to 4 p. m.	Aspect of the Sky.		Feet 40 Upper Inch	Feet 4 Lower Inch	
	Inches															
1	29.961	72.4	73.0	70.4	N. E.	Clear.	29.829	86.9	86.1	67.9	S. W.	Cumuli.	87.6	..	..	
2	.986	77.9	78.8	62.7	N. E.	Cumuli.	.813	86.1	85.0	67.8	S. W.	Ditto.	87.0	..	..	
3	.997	67.3	67.0	51.2	N. W.sp.	Clear.	.901	72.1	71.0	51.9	N. W.	Clear.	73.4	..	..	
4	30.088	67.7	67.5	53.1	N. W.	Ditto.	.942	74.8	73.3	54.8	N. W.	Ditto.	76.0	..	..	
5	.075	68.5	69.6	56.0	S. E.	Ditto.	.940	79.1	78.0	60.2	W.	Ditto.	80.0	..	..	●
6S	.079	69.0	68.8	68 9	S. W.	Ditto.	.900	84.9	83.9	66.3	W.	Ditto.	85 2	..	..	
7	.019	75.7	76.1	70.0	W.	Ditto.	.919	86.0	85 0	66.0	N.	Ditto.	87.0	..	..	
8	.172	68 8	68 9	56.9	N. sharp.	Ditto.	30.038	79.2	77.6	60.4	N. W.	Ditto.	80.1	..	..	
9	.200	69.4	70.4	56.2	N. E.	Ditto.	.042	82.0	80.9	61.0	N. W.	Ditto.	83.0	..	..	
10	.133	73.1	74.0	61.8	N.	Ditto.	.010	85.2	83.9	64.0	N. N. W.	Ditto.	85.8	..	..	
11	.123	74.4	75.3	67.9	W.	Ditto.	29.992	86.4	84.9	67.8	N. N. W.	Ditto.	87.0	..	..	
12	.159	72.9	72.6	70.9	N. N. E.	Cloudy.	.687	85.8	84.9	67.9	S.	Cumuli.	87.0	..	..	☽
13S	.064	76.5	77.0	71.9	W. S.W.	Ditto.	.898	83.1	81.2	71.6	N.sharp.	Cloudy.	85.5	..	..	
14	.113	73.2	73.4	67.6	E. N. E.	Ditto.	30.006	81.4	80.0	67.6	N. E.	Cumuli.	81 7	..	..	
15	.184	73.9	74 2	65.7	N. E.	Clear.	.052	83.0	81.7	67.3	N.	Cumulo strati.	84.3	..	..	
16	.191	72.3	73.0	64.4	N. W.	Ditto.	.009	83.9	83.1	69.0	N. W.	Clear.	84.8	..	..	
17	.084	75.0	76.0	67.0	S. S. W.	Cirro cumuli.	29.911	88.7	87.2	71.6	N. N. W.	Cirro cumuli.	89.5	..	..	
18	.072	74.7	75.0	73.0	N. W.	Cloudy.	.917	88.8	87.4	72.3	W.	Clear.	89.6	..	..	
19	.049	75.9	76.2	68.7	N. W.	Clear.	.896	86.5	85.6	72.7	W.	Cumuli.	87.3	..	..	○
20S	.077	75.5	75.6	73.0	N.	Cloudy.	.907	87.3	86.4	74.8	N. W.	Ditto.	87.9	..	..	
21	.034	77.9	78.0	73.6	S. S. E.	Cirro cumuli.	.893	89.3	87.9	74.8	N. W.	Cloudy.	91.0	..	..	
22	.020	78.3	78.6	72.2	E.	Hazy.	.900	88.0	86.3	72.3	N. W.	Hazy.	90.3	..	..	
23	29.997	79.6	80.9	69 3	N. W.	Cumuli	.837	91.9	91.0	73.0	W.S. W.	Clear.	92.7	..	..	
24	.992	78.8	79.8	74.4	S. W.	Clear.	.835	93.1	91.9	69.8	S. W.	Ditto.	93.8	..	..	
25	30.021	80.2	80.9	74.9	S. W.	Ditto.	.899	94.2	93.0	73.1	N. W.sp.	Cirro Cumuli.	95.4	..	..	
26	.000	81.4	81.9	70.3	N.	Cirro cumuli.	.868	89.2	88.8	71.0	N.	Hazy.	91.4	..	..	
27S	29.987	79.4	79.2	66.0	N.W. sp	Cloudy.	.767	90.4	89.8	70.2	S. W.	Clear.	91.6	..	..	☾
28	.859	80.2	81.0	67.0	N. W.	Clear.	.702	89.5	88 3	70.0	W. S. W.	Ditto.	90.9	..	..	
29	.816	77.8	78.9	70.3	N. W.	Ditto.	.682	91.2	90.3	67.5	W.S. W.	Ditto.	92.0	..	..	
Mean	30.054	74 7	75.2	66.5			29.907	85.8	84.6	67.8			86.9			

A smart shock of Earthquake on the 20th at 5h. 35m. P. M.